STEEL

The Metalworking Weekly

JULY 11, 1960

A PENTON PUBLICATION

What Makes a Small Business Pool Click?

Conceived as a method to help small firms get a bigger share of defense contracts, the program hasn't gotten off the ground.

Jay Lawrence (above), general manager, Allied Specialties Co., Philadelphia, one of the most successful pools, feels that two factors are important if the concept is to work:

1. Financial responsibility must be spelled out and established among the member firms.

2. The pools should be administered by an executive who has no affiliation with any of the member firms.

Mr. Lawrence's group has successfully landed 418 contracts.

The Small Business Administration stands ready to help all interested firms. For guideposts on how you can organize such a pool, see Page 50.

STEEL's Survey of Metalworking's Equipment Buying Plans

13% More Orders in 2nd Half

Hydrospark Forming Technique Offers Good Control, Accuracy

More Jobs Sought for Fluoroscopy

How Steel Imports Shape Up

CONTENTS—TURN PAGE

1,000 Feet of NORMALIZING LINE at Inland Steel

This is another major unit in the continuing expansion program of Inland Steel Company of Chicago. The line normalizes cold rolled mild steel strip, 16 to 24 ga., 24 to 60″ wide, at furnace speed of 50 to 125 f. p. m. 60,000 lb. coils are fed into the line and 40,000 lb. coils are handled at the delivery end. Shearing facilities included in the line are suitable for sheets from 36″ to 192″.

Aetna-Standard's experience with Processing Lines dates back to the earliest production of strip in coils. This experience includes the design and building of many Continuous Electrolytic Tinning, Annealing and Normalizing Lines, as well as Continuous Galvanizing Lines. Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh, Pennsylvania.

Aetna-Standard Division

BLAW-KNOX

This Week in STEEL

The Metalworking Weekly

July 11, 1960 Vol. 147 No. 2

Metalworking Plans More Equipment Buying in 2nd Half

A STEEL survey indicates that U. S. metalworking firms will order 13.6 per cent more equipment (dollar volume) in the second half of 1960 than they did in the first half. For the entire year, buying will be up 17.5 per cent over 1959's. Preliminary estimates indicate order volume in the first half of 1961 will about equal that of 1960's first six months. PAGE 45

Speak Up Now on Depreciation Reform

Last week, the Treasury Department began mailing questionnaires to U. S. firms. Its objective: Find out what industry really wants in the way of depreciation reform. Now's the time to give your opinion. PAGE 49

Primary Metals Growth Projected for 20 Years

Value added by manufacture will be more than six times greater in 1980 than it is this year. Prices may more than triple. Productivity should improve by one-third. Those are some of the probabilities projected for primary metals by Eddy-Rucker-Nickels Co., Cambridge, Mass., a consulting firm. It's the third of six metalworking growth studies prepared for STEEL. PAGE 56

Hydrospark Forming Offers Control, High Accuracy

Hydrospark forming is a high energy rate method. Power is stored in a condenser bank, discharges as a spark or through a wire under water to develop a shock wave. It's used for forming, expanding, and sizing. Die costs are low, and no explosives are involved. The technique, described as "underwater lightning," is attracting a lot of attention among fabricators of parts for aircraft and missiles. It's still in the experimental stage, but STEEL has been told that at least one firm is close to the development of a machine tool that uses the hydrospark principle. PAGE 92

More Jobs Sought for Fluoroscopy

Take a look at fluoroscopy if conventional x-ray inspection isn't providing all the speed and versatility you'd like. Fluoroscopy projects its image on a TV-like screen and permits a "live" picture of both still and moving parts. Here are its advantages plus some current jobs it's doing. PAGE 110

Steel Imports Will Shrink but Not Vanish

U. S. imports of steel are unlikely to come up to the record 4.4 million tons of last year, although the tally for the first four months of this year was 55 per cent ahead of that for the corresponding period of 1959. Much of the upsurge early this year was tonnage booked during last year's steel strike. But don't expect an end to the foreign competition. It has a powerful sales advantage—ability to underprice U. S. products. PAGE 129

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KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Annealing: Its Uses with Alloy Steels

Broadly speaking, the primary purpose of annealing is to soften steel and make it more workable. Annealing, as applied to alloy steels, may be defined as a process that heats above, and furnace-cools through, the critical range at a controlled, specified rate of speed; or that heats to a point within, and furnace-cools to a point below, the critical range. In either case, the choice depends upon the structure and maximum hardness desired.

The first method produces a lamellar pearlitic structure, while the second creates a spheroidized condition. These will be discussed separately in the following paragraphs:

(1) *Lamellar pearlitic structure.* It should be mentioned at once that this structure can be obtained both as described above and by a modified method known as isothermal annealing. In the isothermal process, the steel is heated above the critical temperature (austenitized), then transformed at a predetermined temperature, which depends upon the analysis. This operation requires two furnaces or salt baths —one for austenitizing, one for transformation.

Lamellar pearlitic structures are generally associated with machinability in carbon ranges from 0.20 to 0.60 pct, provided the hardness does not exceed the optimum maximum Brinell numeral. This is especially true where critical tooling is involved. It is a very versatile structure, as it gives best results in such operations as broaching, tapping, threading, deep drilling, boring, milling, and tooling as applied on single- and multiple-spindle bar automatic machines.

(2) *Spheroidized structure.* There are two general fields of use for this type of structure when alloy steels are employed. In the low and medium carbon ranges, spheroidization is necessary for cold-shaping operations, such as heading, extruding, drawing. In the higher carbon ranges (over 0.60 pct), it is mandatory where machining is involved, because it tends to lower the hardness of the steel.

If you want more details about these and other uses of annealing, and the results to be expected, by all means consult with our technical staff. And when you need alloy steels, Bethlehem can offer the full range of AISI standard grades, as well as special-analysis steels and all carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Have YOU a difficult Spring Job?

try

WASHBURN

PHOSPHATE COATED

MUSIC WIRE

114

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

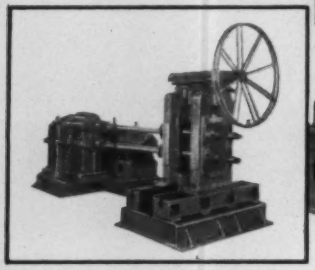
NEW! WARNER & SWASEY'S O-AC Single Spindle Chucking Automatics designed to automate the production of small precision parts...hold exceptionally close tolerances...set up fast on small lots

Whatever your requirements . . . SECO's staff of trained engineers can help you solve any special Mill problem you may have . . . from creative designing through installation (including *all* required auxiliary equipment).

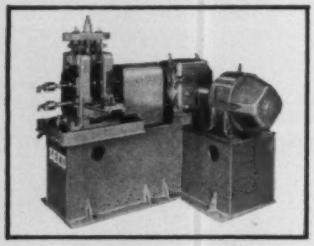
Should your problem involve a special Cluster Mill (to accommodate either ferrous or non-ferrous metals), or a Hot Rolling Mill that bonds non-ferrous metal to a steel base . . . SECO can supply.

Custom Built HOT ROLLING MILLS *by* SECO *assures* Predictable Performance

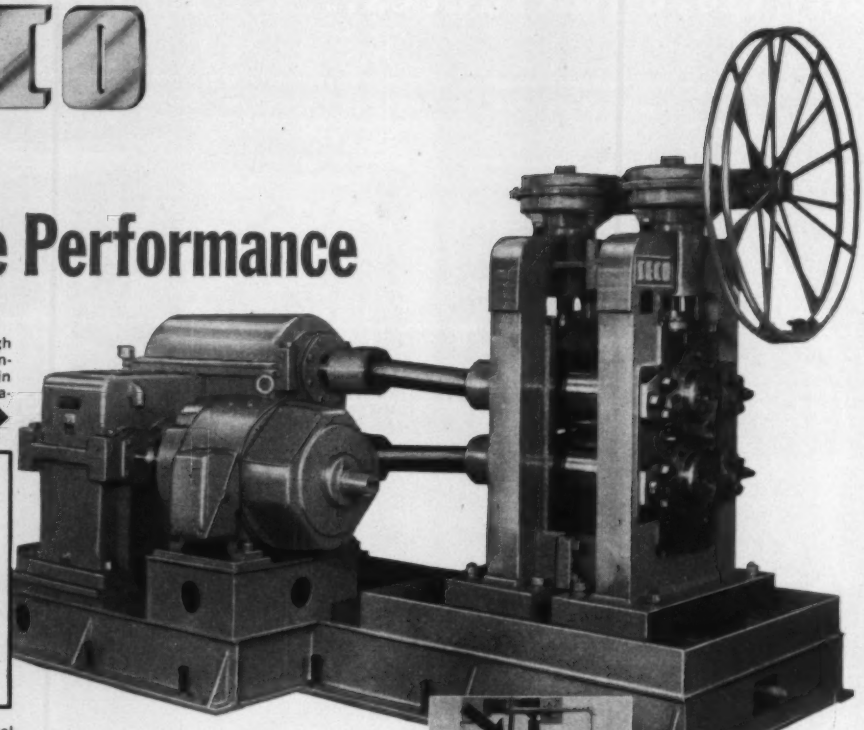
A special, custom-built 2-high Hot Roll Flattening Mill for non-ferrous metals. (Can be built in 2 or 4-high types or a combination of both.) ▶



▲ A SECO designed and built Bi-Metal Bonding Mill on movable mountings.

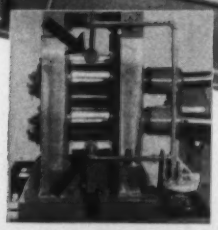


▲ A 6-inch, 2-high Wire Flattening Mill for single or tandem use.



Special Features: ▲

- Water-cooled chocks for lubrication
- 900° F. rolling temperature
- Hand wheel screw-down (adaptable for power)
- Special alloy steel rolls
- Timken Tapered Roller Bearings
- Can be built for 8, 10, 12 or 16-inch widths.



◀ Mill is equipped with two gas jets as a means for pre-heating rolls (see arrows).

SECO

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION

CLEVELAND 22, OHIO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

A Holdup

The editors promised you an article on hydrospark forming for the Fourth of July issue. The story was set in type, but photographs hadn't arrived by the time the presses were ready to roll. Our presentation people ruled that the "underwater lightning" process called for illustrations. Hence, the story was held until this week. You'll find it, fully illustrated, on Page 92.

A Glimpse of the Future

Ideas for stories crop up anywhere . . . An editor suffers the agonies of a traffic jam and proposes an article on urban transportation . . . Two editors chat with a businessman aboard an airliner and our coast-to-coast air safari results. What could be more natural than for STEEL's market research manager, Tom Ballantine, to come up with the germ of our Project 1980 series, a handy tool for business forecasters.

A while back, Tom conferred about economic growth with R. C. Scott, secretary, Eddy-Rucker-Nickels Co., Cambridge, Mass. In a moment of relaxation, they discussed projecting industrial trends based on historical data. Why not for metalworking? asked Tom. The idea clicked with the editors and slide rules were shoved into action. Mr. Scott studied six major S.I.C. groups: Electrical Machinery (see STEEL, June 13); Instruments & Related Products (June 27); Primary Metals (this issue); Fabricated Metal Products; Machinery—Except Electrical; and Transportation. (The last three will appear in alternate issues.) He plotted trends for each of them in six areas: Value added by manufacture, employees' average earnings, total employment, prices, physical output, and productivity.

It's all designed to indicate how your industry will be doing in the next 20 years.

An Admonition

In a nice alliterative phrase, the editors say: "These projections represent probabilities, not precise predictions. Experience indicates that established growth trends change slowly, if at all. But actual conditions in any future year may fluctuate above or below the trend."

With that in mind, plot your marketing and expansion plans to hit the benchmarks positioned by the trend lines.

Curing an Industry's Ills

"The article, 'Ridiculous, Cutthroat Competition and Nobody Wins,' (STEEL, June 13, pp. 111-113) is wonderful," writes R. L. Mullen, president, Lehigh Structural Steel Co., Allentown, Pa.

"If all steel fabricators read it, they will realize that all our difficulties are of our own making. The mention of a good depository (for bids) should show contractors that the concept is feasible and successful in some areas. If contractors continue their shopping and sharp practices, it is entirely possible they will find themselves in the same position as we are . . . Any sickness the article cures will certainly be a help."

A Supplier Writes

"Your May 16 article describing new principles used in transfer machines by George Gorton Co., Racine, Wis., holds considerable interest for us," writes Eugene E. Valy, marketing consultant, Tool & Instrument Div., Illinois Tool Works, Chicago.

"We worked closely with Gorton engineers in perfecting the cutting tools for the various milling operations. I had contact with the tool programing in respect to the cutting tools featured and the material used in end mills and cutters. I would appreciate having a dozen copies of the article."

The Story in Aluminum's Arena

Some eyebrows were hefted a notch when three small primary aluminum makers entered the market a few years ago. Anaconda Aluminum Co., Louisville, Ky., Harvey Aluminum, Torrance, Calif., and Ormet Corp. (owned jointly by Olin Mathieson Chemical Corp. and Revere Copper & Brass Inc.) New York, were the little three that stepped into the arena to buck the industry's giants.

One executive of a small company says they've had some bumps—they moved into the field just when larger companies increased capacities (the industry still faces overcapacity). Now, some of the littler companies feel they're over the hump. The smalls found research and development, prod-

"the HITCHINER way..."

allows flexibility in design with INVESTMENT CASTING

This part is a carrier for a stripper on a citrus peeling machine. It is typical of thousands of irregularly shaped components that are designed with only a particular function in mind and no compromise with production limitations. This type of metal part often requires several changes before the design is finalized.

A late design change in this part, cast in 303 stainless steel, incorporated a 45° bevel, top and bottom on both sides of the serrated pad section. The tooling was altered at very little cost while the cost of the finished casting was not increased at all. The relatively low cost of tooling and tooling changes make the investment casting process an economical and flexible method.

Flexibility in design, a wide freedom of choice in alloy and the elimination of expensive machining operations made possible with the investment casting process may help you solve your parts problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.

Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 23, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

uct specialization, and hard selling helped them crack markets.

New York Resident Editor Brian Wilson has followed and reported the David and Goliath story since it started. Next week, he will give you a ringside description of the fray in nonferrous.

He Requests a Full Set

"I would be pleased to receive all 13 reprints of the Production Efficiency articles; they are useful to me," says M. S. Kozel, director, Technical Services Div., Radiation Inc., Melbourne, Fla. "STEEL has provided not only interesting reading, but timely information as well. I look forward to the 13 articles on Materials Efficiency."

The Incentive to Win

Frank Terrio, our April Usership contest winner, has six months to submit proof that he attained the objectives mentioned in his prize winning entry and thereby earn another award. So do the other winners, but we think Mr. Terrio has an extra incentive that might help him succeed.

Here's why. If Mr. Terrio accomplishes his objective and "reports favorably," he will win an additional $500. When we phoned and congratulated him on winning, it took some bit of persuasion to convince him someone wasn't pulling his leg. Finally convinced, he burst out elatedly: "Is this ever handy—I've just bought a house!"

Whatever your incentives, check the rules that tell how . . .

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—July, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

You can enter as many times as you wish. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Sept. 1.**

...Fluid Power news

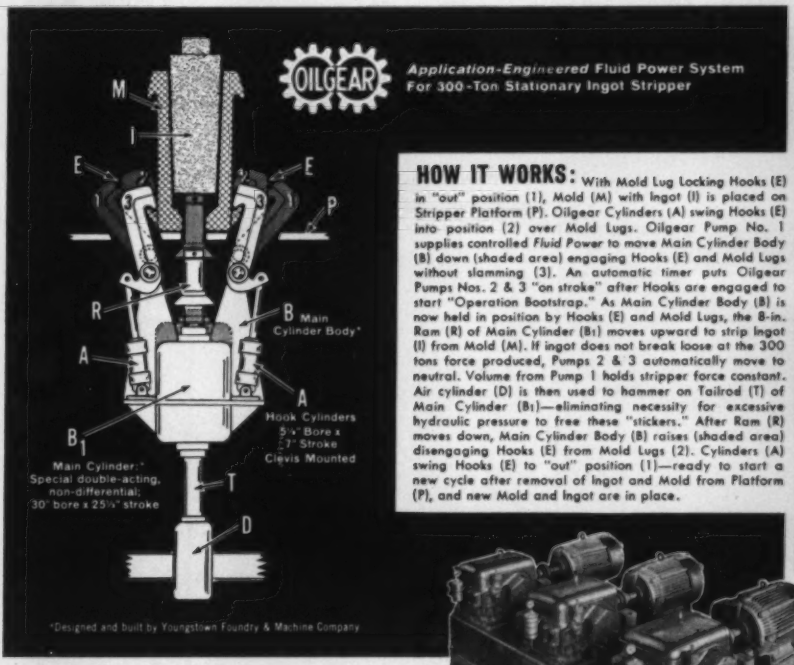
REPORT NO. 11,804 OILGEAR POWERED INGOT STRIPPER

From Oilgear *Application-Engineering* Files

HOW OILGEAR HEAVY-DUTY SYSTEM SIMPLIFIES POWER AND CONTROL OF 300-TON STATIONARY INGOT STRIPPER—HELPS ELIMINATE MAINTENANCE DOWNTIME

DATA: To replace a mechanical-type ingot stripper because of considerable maintenance downtime caused by dirt and foreign particles jamming the motor-driven ram screw—necessitating disassembly of the entire mechanism to free the threads. A hydraulically-powered, floor-mounted stripper design was approved as most convenient for the big-end-up molds used in this particular operation—would provide faster, easier maintenance accessibility at lowest over-all initial replacement cost.

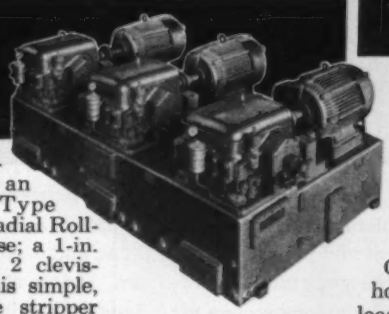
Basic Power and Control Requirements: 1. Simplicity, and trouble-free, rugged dependability. 2. To be capable of many years of heavy-duty, rapid, 'round-the-clock operation with an absolute minimum of maintenance. 3. Must be: impervious to sand, scale, heat; compact; thrifty on electrical power input, wiring, installation downtime, floor space; completely free, if possible, from maintenance-provoking belts, chains, relays. 4. One source and responsibility for power and control systems preferred.



HOW IT WORKS: With Mold Lug Locking Hooks (E) in "out" position (1), Mold (M) with Ingot (I) is placed on Stripper Platform (P). Oilgear Cylinders (A) swing Hooks (E) into position (2) over Mold Lugs. Oilgear Pump No. 1 supplies controlled *Fluid Power* to move Main Cylinder Body (B) down (shaded area) engaging Hooks (E) and Mold Lugs without slamming (3). An automatic timer puts Oilgear Pumps Nos. 2 & 3 "on stroke" after Hooks are engaged to start "Operation Bootstrap." As Main Cylinder Body (B) is now held in position by Hooks (E) and Mold Lugs, the 8-in. Ram (R) of Main Cylinder (B_1) moves upward to strip Ingot (I) from Mold (M). If ingot does not break loose at the 300 tons force produced, Pumps 2 & 3 automatically move to neutral. Volume from Pump 1 holds stripper force constant. Air cylinder (D) is then used to hammer on Tailrod (T) of Main Cylinder (B_1)—eliminating necessity for excessive hydraulic pressure to free these "stickers." After Ram (R) moves down, Main Cylinder Body (B) raises (shaded area) disengaging Hooks (E) from Mold Lugs (2). Cylinders (A) swing Hooks (E) to "out" position (1)—ready to start a new cycle after removal of Ingot and Mold from Platform (P), and new Mold and Ingot are in place.

ABOVE: Oilgear-equipped Ingot Stripper "in action"—Mold Lug Locking Hooks (E) indicated. A 10,000-lb. ingot has just been "stripped" from the mold. Hooks (E) will be disengaged as soon as stripper ram is retracted.

LEFT: Oilgear Heavy-Duty "Power-Pak"—consisting of 3 Oilgear Type "DX-60" Variable Displacement, Two-Way Pumps on a single reservoir base used on this installation—is remotely located, isolated from heat and gritty particles present in the stripping area.



SOLUTION: An *Oilgear Application-Engineered Heavy-Duty System* consisting of an Oilgear "*Power-Pak*" incorporating 3 Type "DX-60" Variable Displacement, 2-Way, Radial Rolling Piston Pumps on a single reservoir base; a 1-in. solenoid-pilot-operated 4-Way Valve; and 2 clevis-mounted Hook Cylinders (A, above). This simple, direct-acting, locked-circuit, push-up-type stripper with remote speed and cycle control . . . space-saving, remotely located "*Power-Paks*" . . . automatic pressure and flood lubrication with continuously filtered power fluid . . . positive, automatic overload protection—has eliminated maintenance downtime problems encountered with the previous mechanical stripper. Long life for continuous, 'round-the-clock production is assured by this automatic, "*Sealed-System*"—aided by the direct application of the pneumatic jarring cylinder to free "frozen" ingots. Lower installation cost, faster—easier accessibility for preventive maintenance are but two additional advantages of this Oilgear-equipped ingot stripper. USER STATES—"*Oilgear was selected because of its simplicity, and the trouble-free, long-life performance record of other Oilgear-equipped machines in our plants.*"

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . . **"for the lowest cost per year . . . it's Oilgear!"**

For solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements directly to . . .

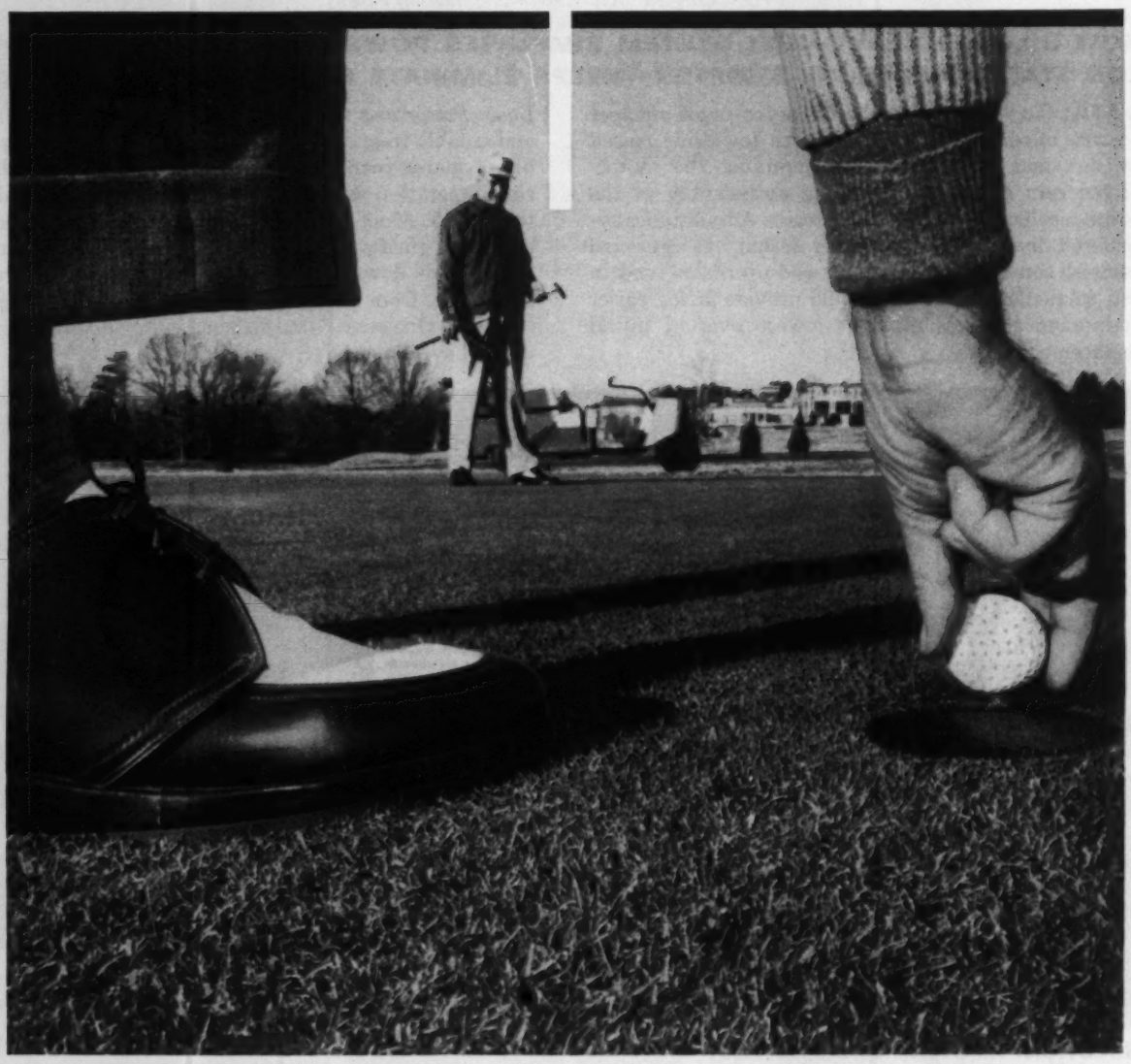
THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414

"We get months more outdoor living since our plant moved here!"



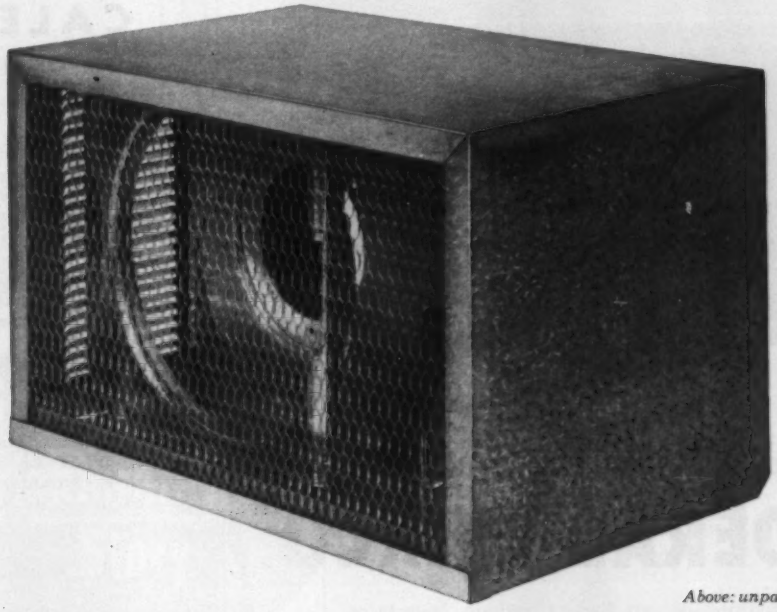
Good living and good working go hand in hand in the Richmond-Petersburg-Hopewell-Colonial Heights area of Virginia. Your golf course, your plant and your home are within minutes of each other. And the same mild Top-of-the-South climate that gives you a long, long season for outdoor fun also assures your plant 365 production days a year. ■ Ask VEPCO about the many other advantages of this strategic industrial-commercial center, with its main line railroads and major airlines, 56 scheduled truck lines, and deep water channel to Hampton Roads and the sea. Better still, let VEPCO do some confidential site hunting for you. No cost or obligation. Write, wire or phone VEPCO today.

VEPCO **VIRGINIA ELECTRIC and POWER COMPANY**

Clark P. Spellman, Manager—Area Development, Electric Building, Richmond 9, Virginia • MIlton 9-1411

SERVING THE TOP-OF-THE-SOUTH WITH 1,990,000 KILOWATTS — DUE TO REACH 2,580,000 KILOWATTS BY 1962

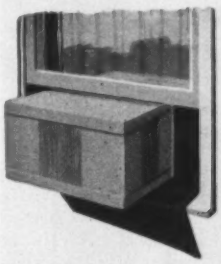
Better Products Through Better Methods and Steels



Above: unpainted air conditioner cabinet

How modern zinc-coated steel sheets keep air conditioners weatherproof—season after season after season.

When cold-rolled sheet steel formed the cabinets and special drawn base pans of air conditioners, they were primed and painted inside and out to protect them from constant exposure and functional moisture. Even so, corrosion often took hold around fastenings, louver edges and scratches.



Now that Weirkote continuous-process zinc-coated steel is used, the cabinet, louvers and chassis can be cut, bent and formed (even worked to the limits of the steel itself) without chipping or flaking the corrosion resistant zinc surface. When the outside paint finish is applied (primarily for decoration) the air conditioner has the double protection of a coating of paint and a coating of zinc assuring corrosion-free service for many years to come.

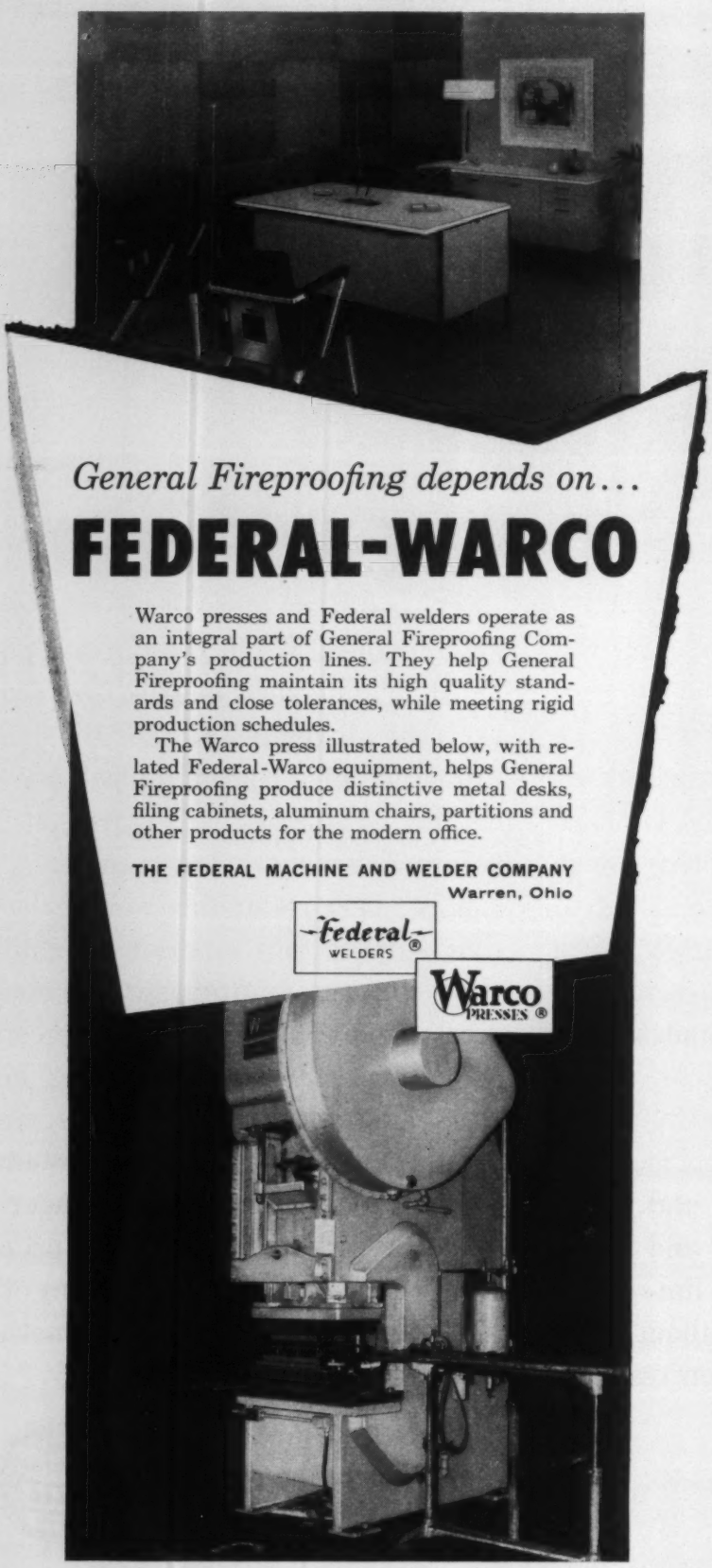
It's because of this weather-shedding surface, this superior formability that continuous-process zinc-coated steel is more and more the metal specified for air conditioning, heating and ventilating equipment.

A major supplier: Weirton Steel Company—producer of Weirkote continuous-process zinc-coated steel and many other steels that improve products, methods and profits throughout industry.

WEIRTON STEEL
Weirton, West Virginia

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Weirkote will also be available in 1961 from National's Midwest Steel Division, Portage, Indiana


General Fireproofing depends on...
FEDERAL-WARCO
Warco presses and Federal welders operate as an integral part of General Fireproofing Company's production lines. They help General Fireproofing maintain its high quality standards and close tolerances, while meeting rigid production schedules.
The Warco press illustrated below, with related Federal-Warco equipment, helps General Fireproofing produce distinctive metal desks, filing cabinets, aluminum chairs, partitions and other products for the modern office.
THE FEDERAL MACHINE AND WELDER COMPANY
Warren, Ohio
Federal WELDERS
Warco PRESSES

CALENDAR
OF MEETINGS

July 11-12, Metallurgical Society of AIME: Conference on response of materials to high velocity deformation, Estes Park, Colo. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

July 22-24, National Association of Metal Finishers: Annual meeting, Statler-Hilton Hotel, Los Angeles. Association's address: 60 Bently Rd., Cedar Grove, N. J. Executive director: P. Peter Kovatis.

July 24-28, American Electroplaters Society: Annual meeting, Statler-Hilton Hotel, Los Angeles. Society's address: 445 Broad St., Newark 2, N. J. Executive secretary: John P. Nichols.

Aug. 8-12, American Institute of Electrical Engineers: Pacific general meeting, U. S. Grant Hotel, San Diego, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 15-17, American Society of Mechanical Engineers and American Institute of Chemical Engineers: Heat transfer conference and exhibit, Statler-Hilton Hotel, Buffalo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Aug. 16-19, Society of Automotive Engineers Inc.: National West Coast meeting, Jack Tar Hotel, San Francisco. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

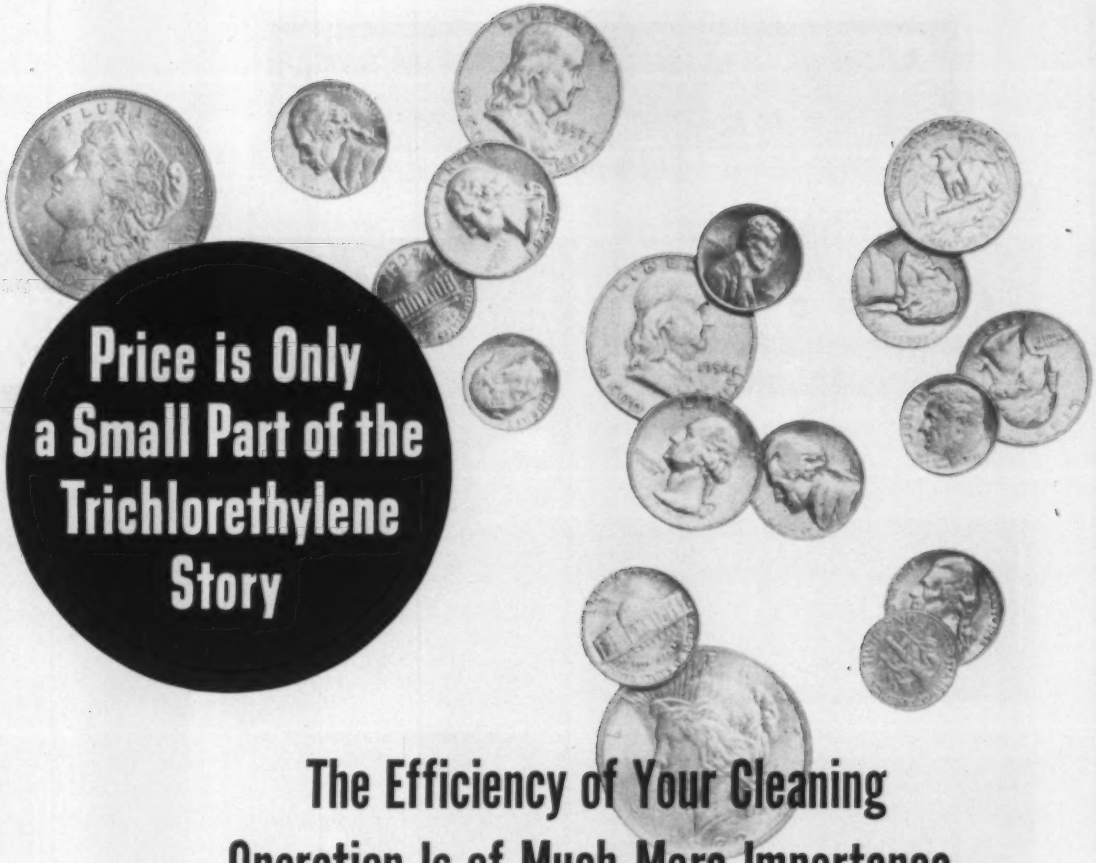
Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders Association: The Machine Tool Exposition — 1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 7-9, American Society of Mechanical Engineers: Instruments and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 7-15, Coliseum Machinery Show: Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, Calif.



Price is Only a Small Part of the Trichlorethylene Story

The Efficiency of Your Cleaning Operation Is of Much More Importance

Detrex Perm-a-clor is universally recognized as a premium grade solvent, selling at regular price. *There is none better.*

Buying from questionable sources or the use of unproved solvent can result in an inferior finishing operation which actually costs money instead of saving it.

One sure way to save *real* money on trichlorethylene is through an expert engineering analysis of the overall degreasing operation—your equipment, your methods, the proper instruction of your people.

Detrex engineers have been making such operational studies for more than 30 years. In many, many instances they have set up a program that has reduced solvent consumption by 15% to 25%. They would like to help you.

Depend on DETREX for Every Metal Cleaning and Processing Need

- PERM-A-CLOR NA (Trichlorethylene)
- Solvent Degreasers
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- Industrial Washer
- Phosphate Coating Compounds
- PAINTBOND Compounds
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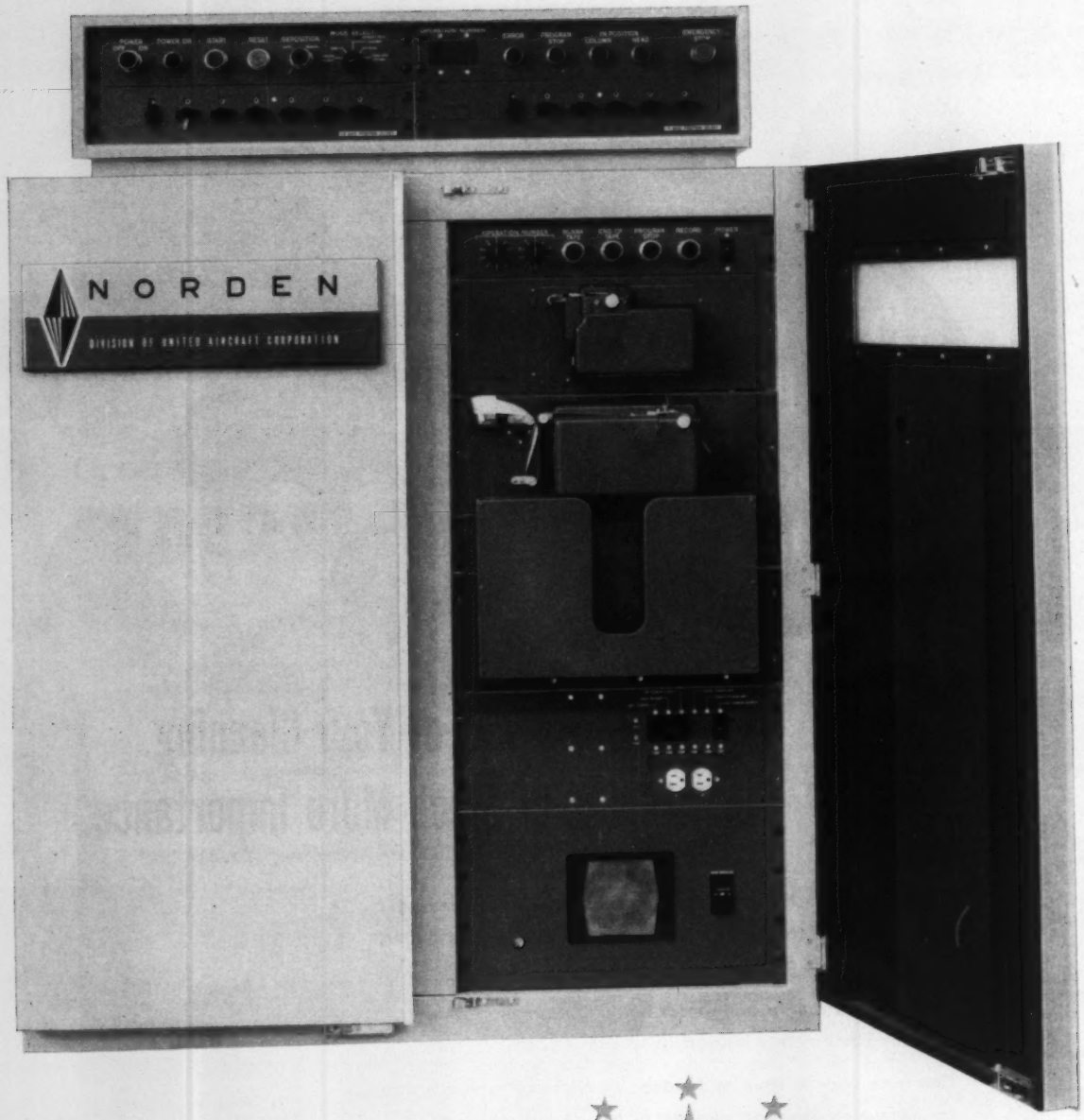
- Alkali and Emulsion Cleaners
- Rustproofing Materials
- Extrusion and Drawing Compounds
- Spray Booth Compounds

Write for Dr. C. E. Kircher's informative article: "How to Get the Most Out of Solvent Degreasing".

DETREX CHEMICAL INDUSTRIES, INC.

Box 501, Dept. S-760, Detroit 32, Michigan

World's Largest Exclusive Producer of Cleaning Chemicals and Equipment



A new concept in Numerical Control

from NORDEN DIVISION

NORDEN Modumatic Control Systems feature display of actual position

■ **With Norden unique components you can automate as much or as little as you need.** This new concept in numerical control is made possible by the exclusive design of a position feedback transducer, electronic circuitry and visual display. These units are available in various systems to show the exact position of the moving members of a machine at all times.

EXACT POSITION READOUT

Series 100—This system displays in straight decimal form the exact position of the tool or work piece. One display is used for each axis of motion.

Features—Illuminated numbers, readable from twenty feet—individual plug-in decimal units—display unit can be located on machine or remote.

AUTOMATIC POSITIONING

Series 600—A completely automatic positioning system with input from either manual dial-in switches or punched tape. Display units provide decimal readout of actual position—not command.

FULL RANGE ORIGIN SELECT

Both **Series 100** display and **Series 600** positioning systems can be supplied with full range electronic origin select. Any desired offset is quickly and easily dialed in by the operator on manual selector switches

Features—Eliminates time consuming readings and calculations—eliminates human error—provides offset calculation automatically—displays exact position numerically.

CONTROLLED PROGRAMMING

These systems are available with automatic tape punch units for tape preparation "on the machine." This provides a permanent inspection record or a programmed tape for playback applications.

PROGRAMMED DIMENSIONAL INSPECTION

This new Norden concept now makes possible automatic inspection of parts by measuring their exact shape and contour. Since each point on the part's surface has a digital value this information can be easily programmed. Corresponding points on the actual part can be probed automatically and their dimensions compared with the programmed information. The system can be provided with direct numeric print or readout of actual dimensions, deviations from nominal, or out of tolerance indications. In addition, punched tape output is available.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

When in Chicago see us at the Production Engineering Show, Navy Pier, Booth 221. At the National Machine Tool Builders Exposition, see Norden Controlled Machines exhibited by G. A. Gray Company, Atlantic Machine Tool Works, LaPointe Machine Tool Company.

For more information contact your nearest Norden Representative, 400 Main Street, E. Hartford, Connecticut, JAckson 8-4811, 11 West Monument Avenue, Dayton 2, Ohio, BAldwin 8-4481, or write us at the address below.

OF UNITED AIRCRAFT CORPORATION

DATA SYSTEMS DEPARTMENT

SANTA ANA, CALIFORNIA

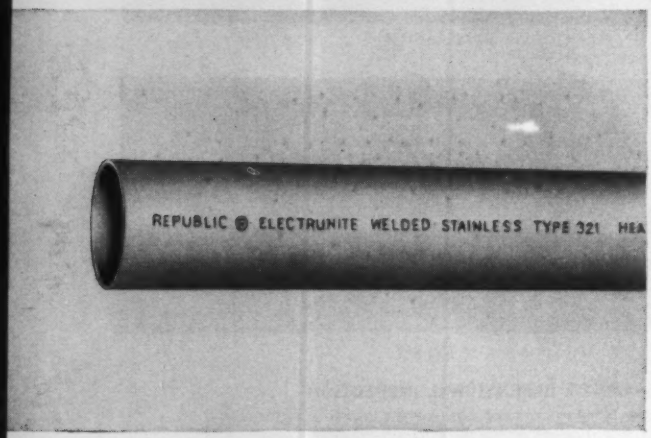
Grumman Aircraft Engineering...
SAVES TAXPAYER DOLLARS WITH REPUBLIC ELECTRUNITE STAINLESS STEEL TUBING

Grumman Aircraft Engineering Corporation has substantially reduced production costs of the exhaust system used in the Grumman S2F Tracker, through the use of Republic ELECTRUNITE Stainless Steel Tubing.

Since using ELECTRUNITE, Grumman has reduced scrap loss by 50%. Fabrication time is 30% less, with further savings through longer tool wear.

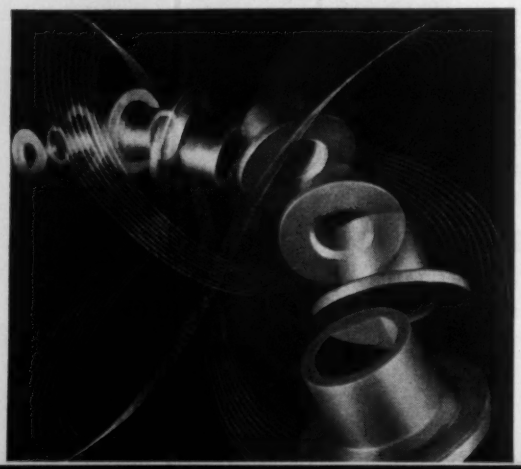
ELECTRUNITE® Stainless Steel and Carbon Steel Tubing is available in a wide range of sizes, gages, wall thicknesses, to meet practically any national security, manufacturing, fabricating, and pressure tubing application. Call your Republic representative for complete information and specifications. Or, write direct.

Republic ELECTRUNITE Stainless Steel Tubing, Type 321, is used in the exhaust system of the Grumman S2F Tracker, saving taxpayer dollars. ELECTRUNITE can save money for you, too.



Further savings are realized through Republic's Steel and Tubes Division manufacturing facilities of bending, forming, welding operations. Write for information.

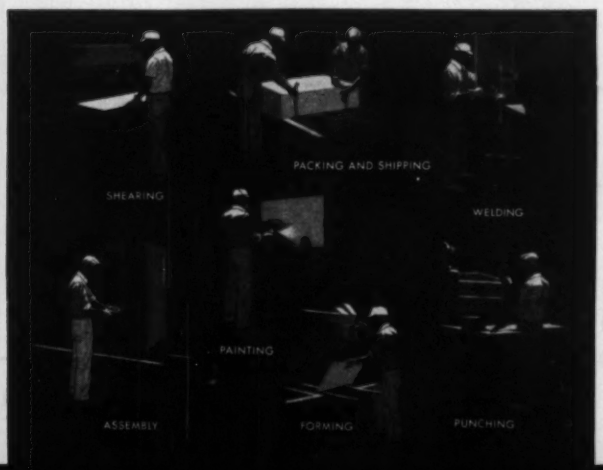
REPUBLIC HS6460 HIGH STRENGTH POWDER can be used to produce comparable strength structural parts at lower manufacturing costs than obtainable with copper infiltration. Additional production economies can be achieved because fewer operations will be required to obtain high density, higher strength parts. HS6460 is capable of a minimum tensile strength of 60,000 psi at 6.4 density —100,000 psi after heat treatment. Write today.



REPUBLIC GALVANNEALED SHEETS solve corrosion problem in Kathabar® units, manufactured by Surface Combustion Corporation. Units are designed to lower or raise the relative air humidity through evaporation or absorption of moisture. Republic Galvannealed, used for coil tube sheets, takes all forming operations. Corrosion and rust problems are held to an absolute minimum. Write today.

GRUMMAN S2F TRACKER—first airplane specifically designed to detect, identify, track, and destroy enemy submarines. The Tracker utilizes radar, sonobouys, and Magnetic Airborne Detector gear to pinpoint the enemy, then chooses either torpedo, depth charges, or rockets to effect the kill.

REPUBLIC CAN DO IT FOR YOU with complete sheet steel fabrication facilities. Contract manufacturing is a full-time operation at Republic's Berger Division. Engineers work with you in developing your product and in solving manufacturing, assembly, and delivery problems. Well rounded stock of tools, dies, and a complete machine shop. Modern production lines for shearing, punching, forming, painting and assembly. To learn more about Republic-Berger contract facilities, call your Republic representative, or write today.



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World's Widest Range of Standard Steels and Steel Products

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Please send more information on the following products:

- ☐ Republic ELECTRUNITE® Stainless Steel Tubing ☐ Carbon
- ☐ Republic Steel and Tubes Division Manufacturing Facilities
- ☐ Republic HS6460 High Strength Powder
- ☐ Republic Galvannealed Sheets
- ☐ Republic Berger Division Contract Facilities

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LUCKY LUCY

She doesn't depend on crossed fingers to safeguard her health. She knows many types of cancer can be cured if treated in time, so she sees her doctor at the first sign of something wrong.

CHIPPER CHARLIE

Her husband Charlie has never been sick a day in his life. But he knows it can happen to him, so he gets a regular checkup every year.

Lucy and Charlie also contribute generously to the American Cancer Society Crusade because they know this is the best way to help conquer cancer. Guard your family – fight cancer with a checkup and a check. Send your contributions to "Cancer," in care of your local post office.

AMERICAN CANCER SOCIETY

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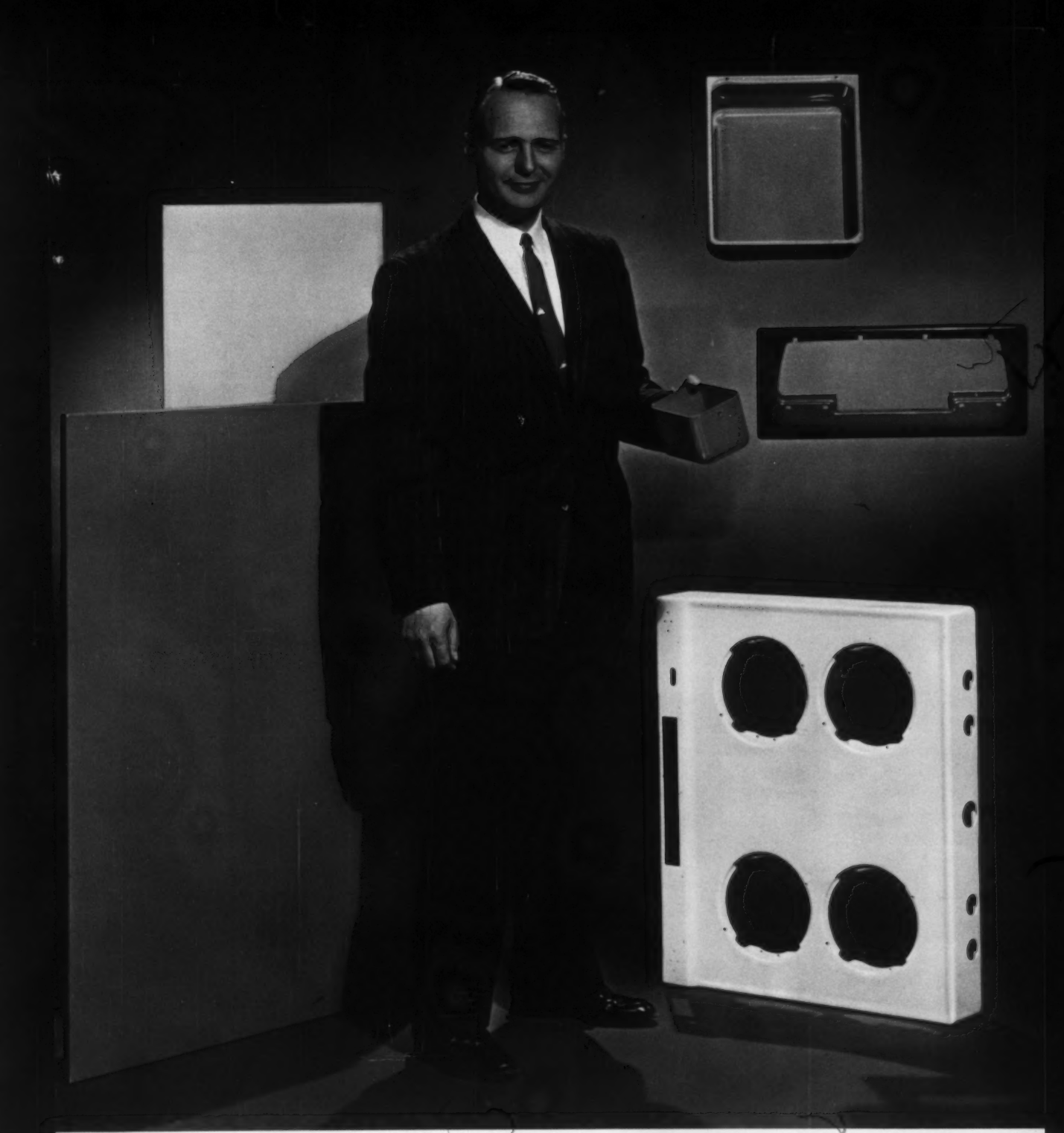


BETHNAMEL

a brand ***NEW*** *kind of* ***STEEL SHEET***
for porcelain enameling

BETHLEHEM STEEL

NEW BETHNAMEL

BETHLEHEM STEEL

...superb results at low costs

...for either two-coat or direct-on porcelain enameling

Here is a totally new kind of steel sheet which provides a really outstanding enameling job, not only in the standard two-coat process but for single, "direct-on" cover coating too.

Developed by Bethlehem research engineers, Bethnamel is produced by an entirely new method. This new sheet has the amazingly low carbon content of about .003 pct, barely 1/10th that of ordinary enameling iron. Other elements are properly balanced to maintain superb enameling properties, and provide good sag resistance, drawability, and weldability, as well.

Single-Coat with Minor Changes in Cycle

With Bethnamel, boiling and fish-scaling are no problem, making this remarkable new sheet far superior to other enameling materials in the direct-on cover coat process. Simple, inexpensive modifications of existing two-coat pre-treatments are all that are needed to assure excellent adherence and rich appearance of the enamel.

Direct-on Method Cuts Costs

Bethnamel costs no more than conventional enameling iron. Thus enamelers can save on processing without adding to base metal costs. Bethlehem engineers are anxious to help you get started with this superior enameling sheet. If you're interested, by all means let our nearest sales office give you full details.

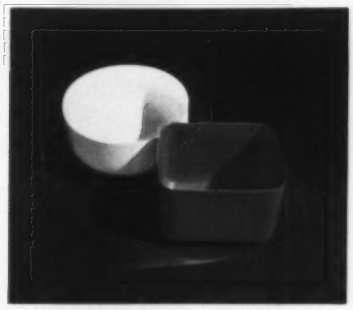
RANGE TOPS DEEP-DRAWN at Caloric Appliance Corp., Topton, Pa., are unusually tough draws, because of the relatively sharp corners. Bethnamel sheets take this severe drawing beautifully, prior to enameling.

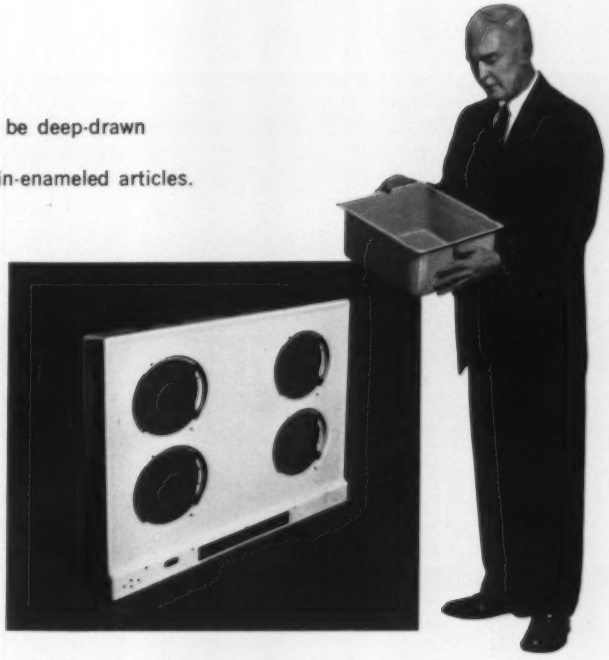
GAY PORCELAIN-ENAMELED PANELS on this school speak for the rapid growth of colorful curtain wall construction. Bethnamel sheets have proved ideal for these applications, due to high sag resistance and excellent enameling properties.

BETHLEHEM ENGINEERS WILL

BETHNAMEL EASY TO DEEP-DRAW

Drawing-quality Bethnamel sheets can be deep-drawn with superior results, as shown in this group of tough-to-make porcelain-enameled articles. No splits or cracks here!





SUPERIOR SAG RESISTANCE

These 20-ga samples of Bethnamel (A), enameling iron (B), and cold-rolled steel (C), demonstrate that Bethnamel's sag resistance is better than that of enameling iron, and far superior to cold-rolled sheet steel, at firing temperatures of 1600 degrees.

ENAMEL THAT REALLY STAYS ON

In this torsion test, a simple angle of direct-coated Bethnamel was twisted 180 degrees without damage to the enamel. Because its thickness is only 3 to 4 mils, compared to 6 to 8 mils or more for 2 coats, a direct-on enamel can withstand much rougher handling!

TYPICAL MECHANICAL PROPERTIES

20-Gage Bethnamel Sheet

	Yield Strength (psi)	Tensile Strength (psi)	Total Elongation	Rockwell B	Olsen Cup Test (inches)
Longitudinal	26,000	43,000	38 pct	43	0.425
Transverse	28,000	44,000	40 pct		

HELP YOU WITH YOUR STEELWORKING PROBLEMS

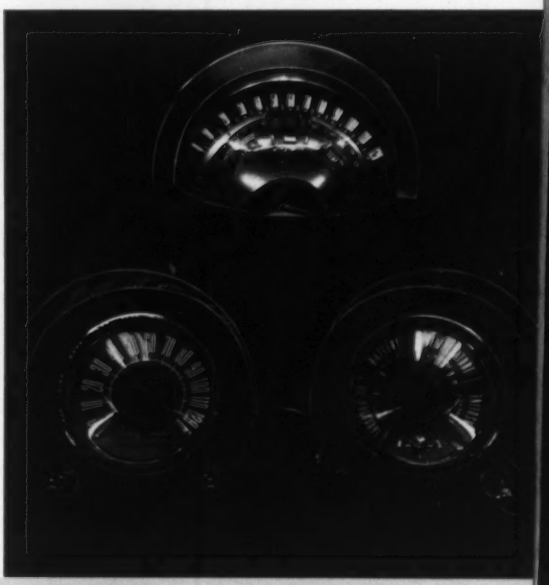
BETHLEHEM STEEL

NEW BETHNAMEL
lights up like a lamp!

Now sheet-steel-and-ceramic panels can light up a room without bulbs, tubes, filaments, or cathodes! Called Panelescent® Lighting, this revolutionary "area" source of light is a development of Sylvania Lighting Products. A whole ceiling can become one huge lamp, or specific portions of an area can be lighted up, as in the automobile instrument panels shown here.

New Bethnamel sheet steel is proving to be a very practical base metal for Panelescent® applications. Sylvania is just one of many companies which are growing increasingly enthusiastic about Bethnamel. The future looks bright, both for Bethnamel and the porcelain enameling industry!

"Panelescent®" is Sylvania's registered trade name for electroluminescence



Steel
is strong, ductile, versatile... AND BETHLEHEM MAKES IT IN NEARLY EVERY FORM

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded steels
Special rolled sections

TOOL STEELS:
Water, oil, and air-hardening grades

ROD AND WIRE:
General and special-purpose types
Fine and shaped wire

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged sections

SHEETS:
Hot- and cold-rolled
Continuously galvanized
Enameling sheets

TIN MILL PRODUCTS:
Electrolytic and hot-dip tinplate; blackplate

PLATES:
Universal and sheared
Flanged and dished heads

FASTENERS:
Bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous butt-weld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

FREIGHT CARS, PARTS, WHEELS, AXLES

WIRE ROPE AND SLINGS

RAILS:
Tee, crane, girder

CASTINGS:
Carbon, alloy, and stainless steel
Iron, brass, bronze

Room 1041,
Bethlehem Steel Company, Bethlehem, Pa. M10

Please send me literature describing these products:

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Name_____

Company_____

Address_____

City_____ Zone_____ State_____

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

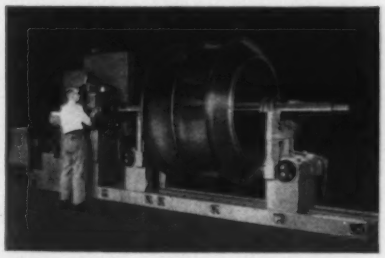
Would you take a parrot's word for it?

Why take anybody's word for it?

Static and dynamic balancing of rotating parts is a critical quality control process. The elimination of destructive vibration is "life insurance" for your product. It is worth doing *correctly*.

Test before you buy! When you buy a balancing machine, you'll want to outline your requirements specifically—and insist on comparative tests. Only then can you *know* what you're buying. No reliable supplier of balancing machines will refuse to cooperate in these tests!

Gisholt shows you. Gisholt invites you to see your work balanced on a Gisholt Balancer and to observe a series of scientific balancing tests—to prove that your tolerances and production requirements will be met, *before* you buy!



Gisholt 6U Balancer handles variety of rotors from 350 to 10,000 lbs. This 5600 lb., double-inlet wheel and shaft assembly is rotated at 150 r.p.m. and balanced within .0003" bearing displacement. Despite heavy workpieces and massive machine, no special foundation is required for accurate operation.

FREE BOOKLET—Because there are vast differences in balancing equipment, it is important to know how the basic methods of measuring unbalance compare (mechanical, optical and electrical). The Gisholt Balancing Catalog explains these methods in detail—so that you can easily draw your own conclusions.

Ask your Gisholt Representative for this booklet or write for your free copy.

MMT=PE
MODERN MACHINE TOOLS = PRODUCTION EFFICIENCY

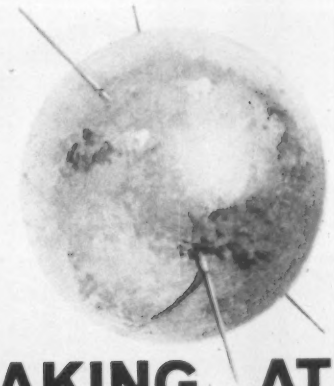
MASTERCRAFT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Machines
• *Factory-Rebuilt Machines with New-Machine Guarantee*

Investigate Gisholt's Extended Payment and Leasing Plans



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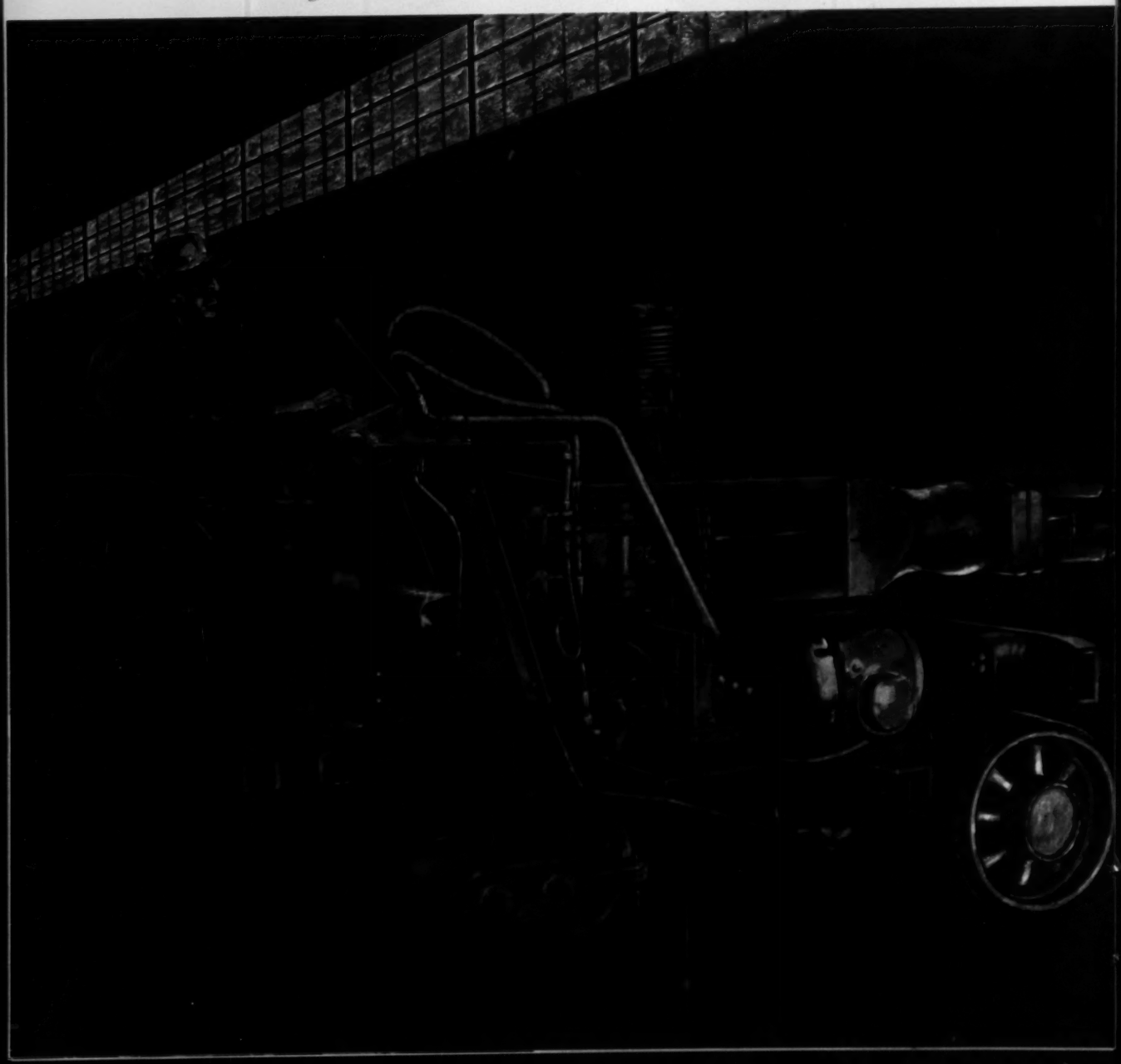
. . . A Proud Inheritance That Benefits You



It takes a lot of know-how and attention to infinite detail to launch a U. S. space satellite. Everything's got to be as near perfect as humanly possible. That's why the scientists and engineers who design our missiles look to Jessop for quality steels.

Jessop makes heat, corrosion, abrasion and shock resistant steels, non-magnetic and precision ground steels, high speed, cast-to-shape, clad, stainless and alloy steels and many others. And behind every pound of steel you order from Jessop is a well-deserved reputation for excellence of product.

The name Jessop has been synonymous with quality steels since 1774. Today, backed up by generations of experience, Steelmaking at Jessop is a proud inheritance—an important plus factor you should consider when buying steel.

Jessop now has six plants and service center locations in the United States and Canada with general sales offices in 23 major cities of North America. Why don't you pick up your telephone, call a Jessop office and discuss *your* needs for specialty and alloy steels.

JESSOP
STEEL COMPANY

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An invitation

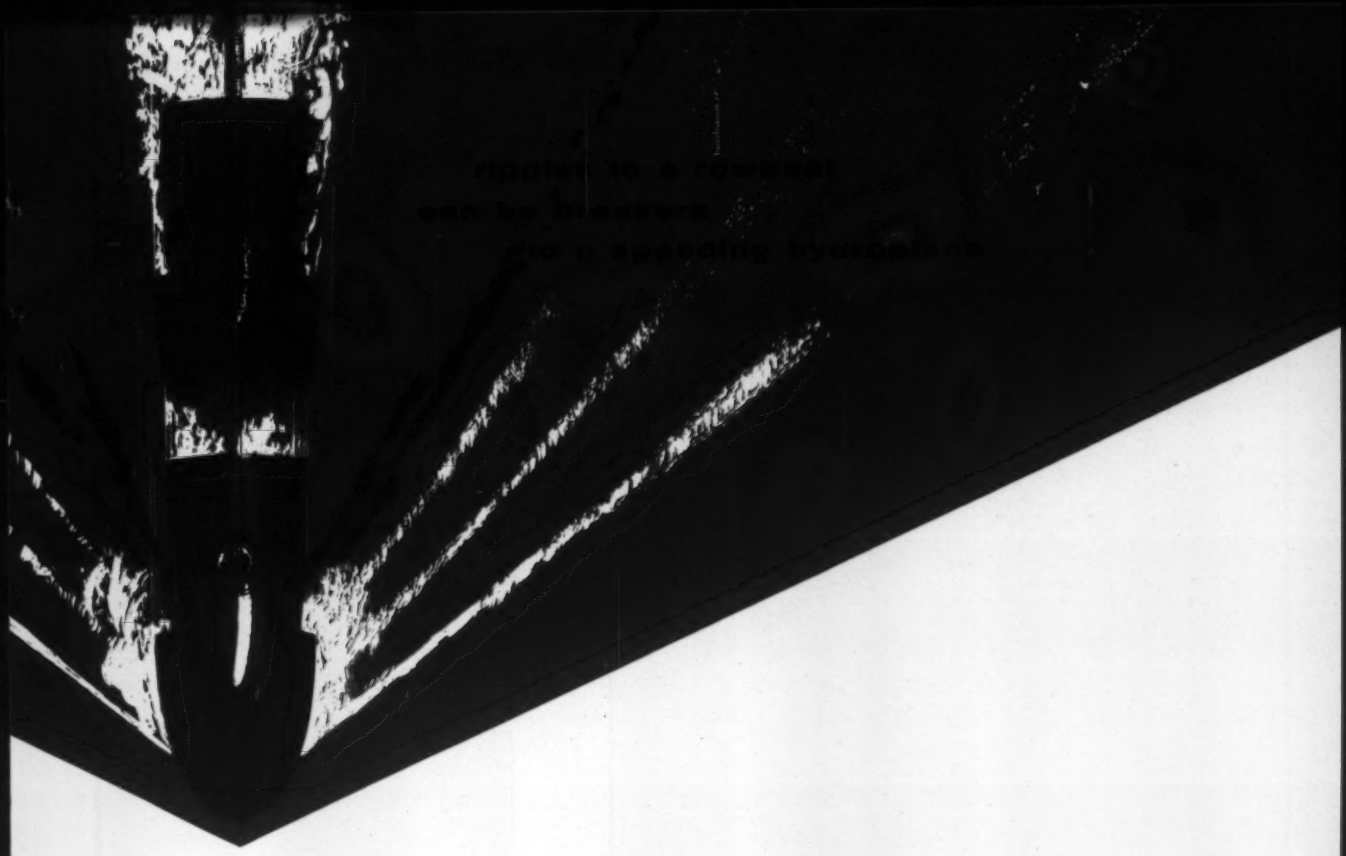
You are cordially invited to join this distinguished group of companies who have entrusted us with the responsibility for solving subcontract problems on components, assemblies and complete, high-precision machines.

Your subcontract headaches will disappear fast in TMW's million square feet of completely integrated manufacturing facilities which include: 1200 *modern* machine tools, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen with a corps of industry's top designers and engineers.

TMW's facilities and 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now*, on a short or long-term basis. For more details, or for new Facilities File Folder, call or write: Textile Machine Works, Contract Division, Reading, Penna.

TEXTILE MACHINE WORKS

CONTRACT DIVISION • Reading, Pennsylvania



the harder you fight
to **beat** production records
the more you need
ultra-smooth running...

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MADE IN USA ... *and made better to bring out the* ***BEST*** *in your products*

Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn.
Phone PLaza 4-1171

8SC60

what Scovill is doing to give you metals that can **outrun** modern machines

More uniformly sound metal — Scovill's unique CONTINUOUS BAR CASTING machine handles 30,000 lbs. of molten alloy per hour, but metal from the melting furnaces does not go directly into the casting mold. A 9000-lb. reservoir of the liquid alloy tends to "blend" out any possible variations remaining in the already precisely-controlled melt.
In addition, the controlled and uniform conditions under which the continuous-casting takes place are conducive to exceptional uniformity in cast metal structure. Such uniformity in the cast bar or billet remains with the metal right through to the finished mill products.

More uniformly dimensioned mill products — Scovill's up-to-the-minute mill equipment and procedures, with tight quality control at every step, assure fabricators the close tolerances that high-speed production machinery MUST have . . . uniform thickness of sheet and strip, uniform O. D. of rod and wire, uniform diameter and wall thickness of tube. Close mill tolerances also apply to widths, straightness and surface condition of the metal.

More uniform finishes...color...working qualities — Great strides have been taken in recent years to give fabricators mill products with *inherent* qualities that help reduce additional finishing costs. Scovill mill finishes are superior and uniformly maintained order after order . . . lot after lot . . . an important aid in maintaining your own controlled-quality standards at minimum unit cost.

Longer continuous runs — Recent advances in Continuous Casting and subsequent mill production processes now permit Scovill to offer the industry's longest coils of brass strip and sheet for high-speed press runs. Equivalent extra-long-run coils are also available in TRUSPEC Aluminum sheet. Recent Mill production advances permit longer lengths in other mill products where required.

Technical services — Scovill Metals Research and our extensive experience can be tremendously valuable to fabricators looking for NEW ways to advance competitively. It will pay to make Scovill service a part of your team.

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. . . and made better to bring out the ***BEST*** *in your products*

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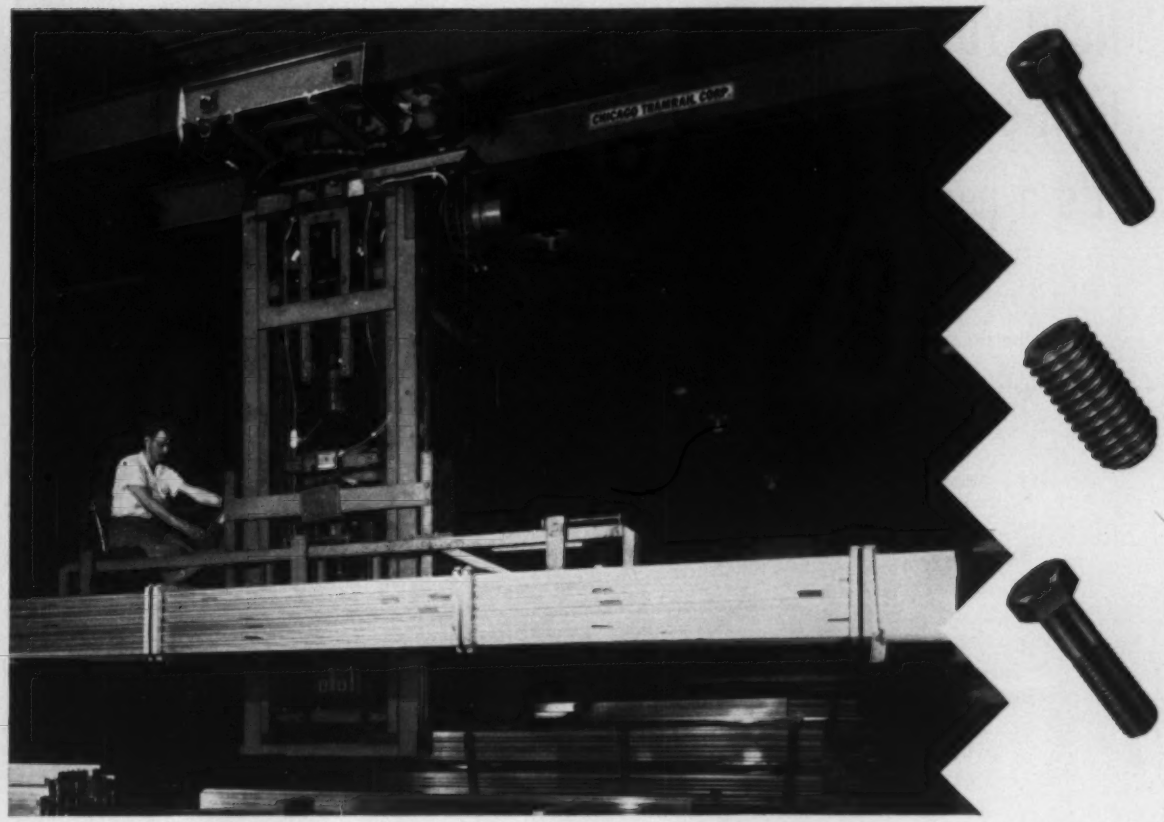
MILL PRODUCTS

IT PAYS TO STANDARDIZE ON **STANSCREW**



17 different Stanscrew fasteners used in Chicago Tramrail's Trak-Rak

"In constructing our complete line of cranes we make no compromise with the most rigid requirements of safety," says S. W. Fountain, Vice-President, Chicago Tramrail Corporation. "Therefore, reliability is our principle reason for standardizing on quality components such as Stanscrew fasteners."

"But Stanscrew gives us more than fast service and reliable products. Their broad line of over 5,000 fasteners offers a wide selection . . . and their fastener specialists and engineers are always ready to assist our design department in determining the strongest, safest, most economical fastener for every application. For example, in our Trak-Rak stacking crane above, 17 different Stanscrew fasteners are used . . . each selected after careful study for the precise job it has to fill."

Like Chicago Tramrail, many other industrial leaders have learned it pays to capitalize on Stanscrew's backlog of over 80 years of fastener experience. To use this accumulated knowledge in solving your particular fastener problem, just call your Stanscrew distributor. He will quickly arrange for a visit from your Stanscrew fastener specialist.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

ANOTHER NORTON PRODUCT

Now! YOUR Lab for better finishes built especially for YOU, it's a perfect place to:

- solve a particular production problem
- determine the advantages of wide-belt sheet polishing
- investigate new off-hand polishing techniques
- train production men
- increase production — lower costs — improve finishes

the men and machines in this building can help you

This is "Abrasive Tech" the Product Engineering Department of Behr-Manning Co.; inside are assembled the most modern production equipment and prototypes of the newest machines for every phase of coated abrasive grinding and polishing of every known material.

Inside are "Abrasive Tech" specialists — engineering and production experts whose job is to devote their time, skill and energies to helping you solve your problems. And they know their business. There are also Behr-Manning Machinery Methods Rooms in 16 conveniently located branches to help you in exactly the same way. Write for a detailed brochure of "Abrasive Tech" Product Engineering facilities and a list of the machinery at your service. Dept. S-7, BEHR-MANNING Co., Troy, N. Y., a Division of Norton Company.

Branches in: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, New York, Philadelphia, St. Louis, San Francisco, Seattle.

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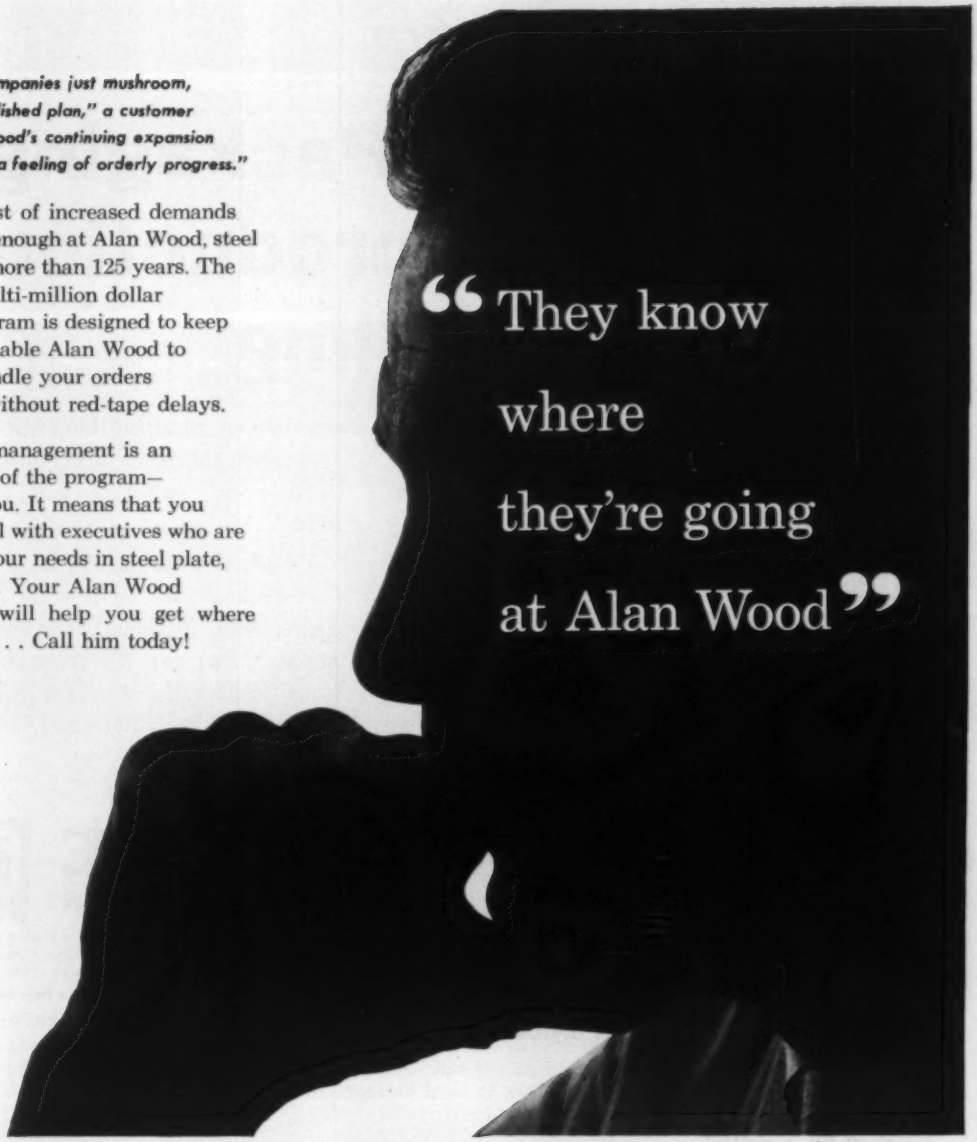
"A good many companies just mushroom, without any established plan," a customer remarks. "Alan Wood's continuing expansion program gives us a feeling of orderly progress."

Keeping abreast of increased demands for steel is not enough at Alan Wood, steel producers for more than 125 years. The Alan Wood multi-million dollar expansion program is designed to keep *ahead* . . . to enable Alan Wood to continue to handle your orders immediately, without red-tape delays.

Continuity of management is an important part of the program—important to you. It means that you continue to deal with executives who are familiar with your needs in steel plate, strip and sheet. Your Alan Wood representative will help you get where *you* are going . . . Call him today!



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Customer reports confirm...

CF&I Wire Packaging increases production, eases handling

In instance after instance, all across the country, manufacturers have reported cutting hours off daily downtime, easing storage and handling problems... *increasing production as much as 50%*... after they started using CF&I Steel Wire — Packaged for Your Production.

This is possible because all CF&I Wire is packaged specifically to give you one, or a number of special production or handling benefits. Several typical statements describing users' production benefits are reported here.

CF&I, the pioneer in wire packaging, makes wire in a wide range of gages and finishes. Whatever your needs, CF&I can fill them. Call your local CF&I sales office for full details on the Wire Packaged for Your Production.

CF&I-WICKWIRE WIRE

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In the West: THE COLORADO FUEL AND IRON CORPORATION — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

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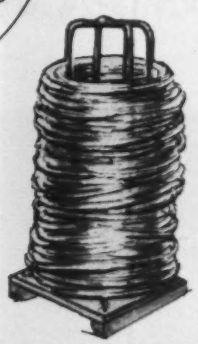
PACKAGED for YOUR PRODUCTION

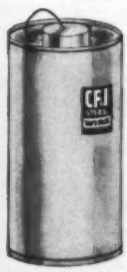


DISPOSABLE STEM-PAKS®
Capacity—500-1000 lbs.

Customer Report—
"50% increase in production since we started using Stem-Paks."

DISPOSABLE SPOOLS
Capacity—5-70 lbs.

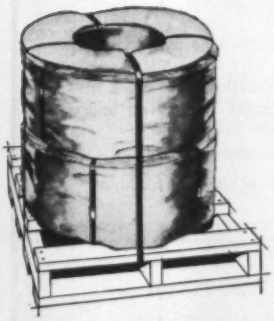
Customer Report—
"Easy to handle and store... quick to put in operation."



FIBRE DRUMS
Capacity—250-600 lbs.

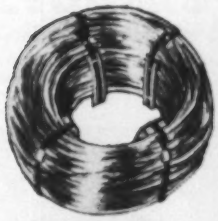
Customer Report—
"Wire protected from dust, rust and corrosive fumes. Easier handling, storage, inventory."

RETURNABLE SPIDERS: Capacity — 2000-3000 lbs. Customer Report — "25% increase in production, 20% less downtime and 80% less scrap loss with the long, uninterrupted pay-off of these returnable spiders." CF&I produces top quality wire in thousands of different types, sizes, shapes and finishes to meet all types of wire applications.



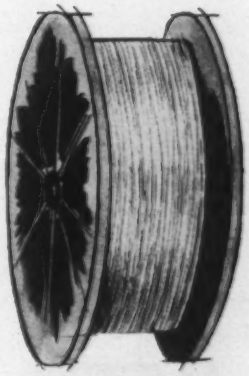
REEL-LESS CORES
Capacity—800-1000 lbs.

Customer Report—
"Easier handling, less storage problems and lower freight handling charges."



SHAPED COILS
Capacity—1500-2500 lbs.

Customer Report—
"20% increased production with longer runs, plus easier storage and reduced handling costs."



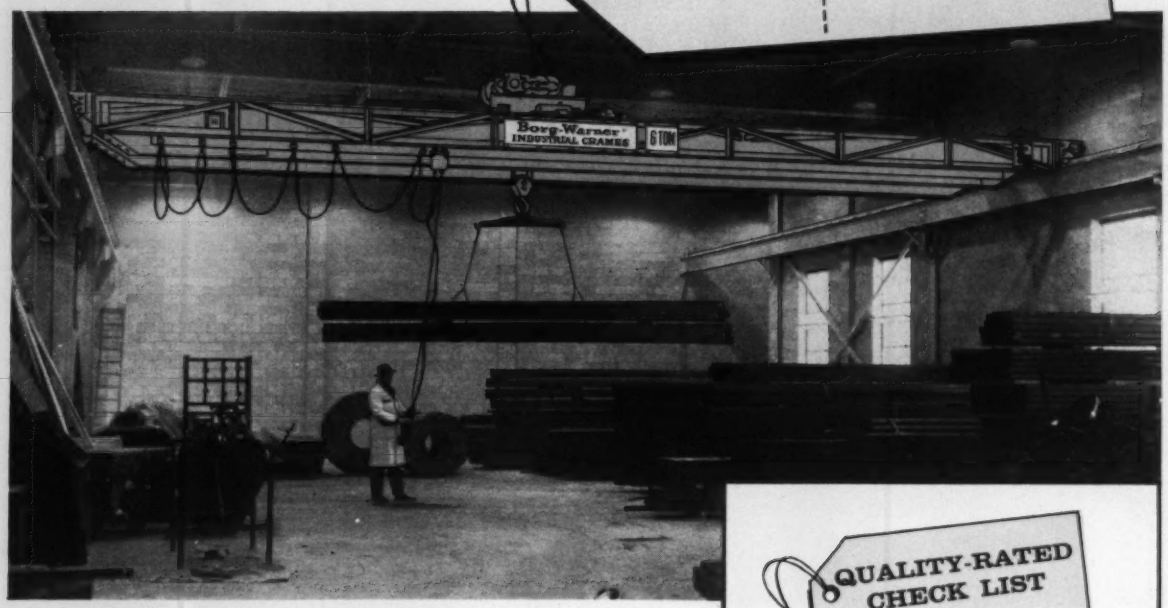
RETURNABLE STEEL REELS
Capacity—500-800 lbs.

Customer Report—
"Holds six times the wire as standard coils. Smoother pay-off, less scrap loss, easier shipping."

You Can Afford Borg-Warner Quality...

A Borg-Warner QUALITY-RATED Crane

$7900.00 for a 6-ton, 46 ft. Span 3 Motor, Top Running, Double Girder Industrial Service Crane



Standardization plus Advanced Engineering.

Borg-Warner crane engineers and production specialists have come up with important economies through extensive use of standardized, interchangeable components. These savings are passed along to you, giving you more for your money when you specify Borg-Warner Industrial Cranes.

An efficient, modern crane system may cost far less than you think. Owners of existing crane systems usually overestimate the cost of new equipment.

If you're planning a new plant, or if you are planning to expand or modernize, get all the facts about Borg-Warner QUALITY-RATED cranes. They're your best VALUE in overhead material handling equipment.

QUALITY-RATED CHECK LIST

- Full 6 ton rating with ample reserve capacity.
- Cambered bridge girders.
- Heavy-duty double reeved hoist.
- Heavy-duty rolled steel wheels.
- Rotating axles on bridge and trolley.
- Totally enclosed gearing.
- All welded, jig-assembled end trucks.
- Precision ball and roller bearings throughout.
- Precision assembly with fitted bolts in reamed holes.
- Totally enclosed crane and hoist duty motors.
- Magnetic bridge brake.
- Heavy-duty double reduction bridge drive.
- Full magnetic push-button control.

A maximum value at $7,900.00.

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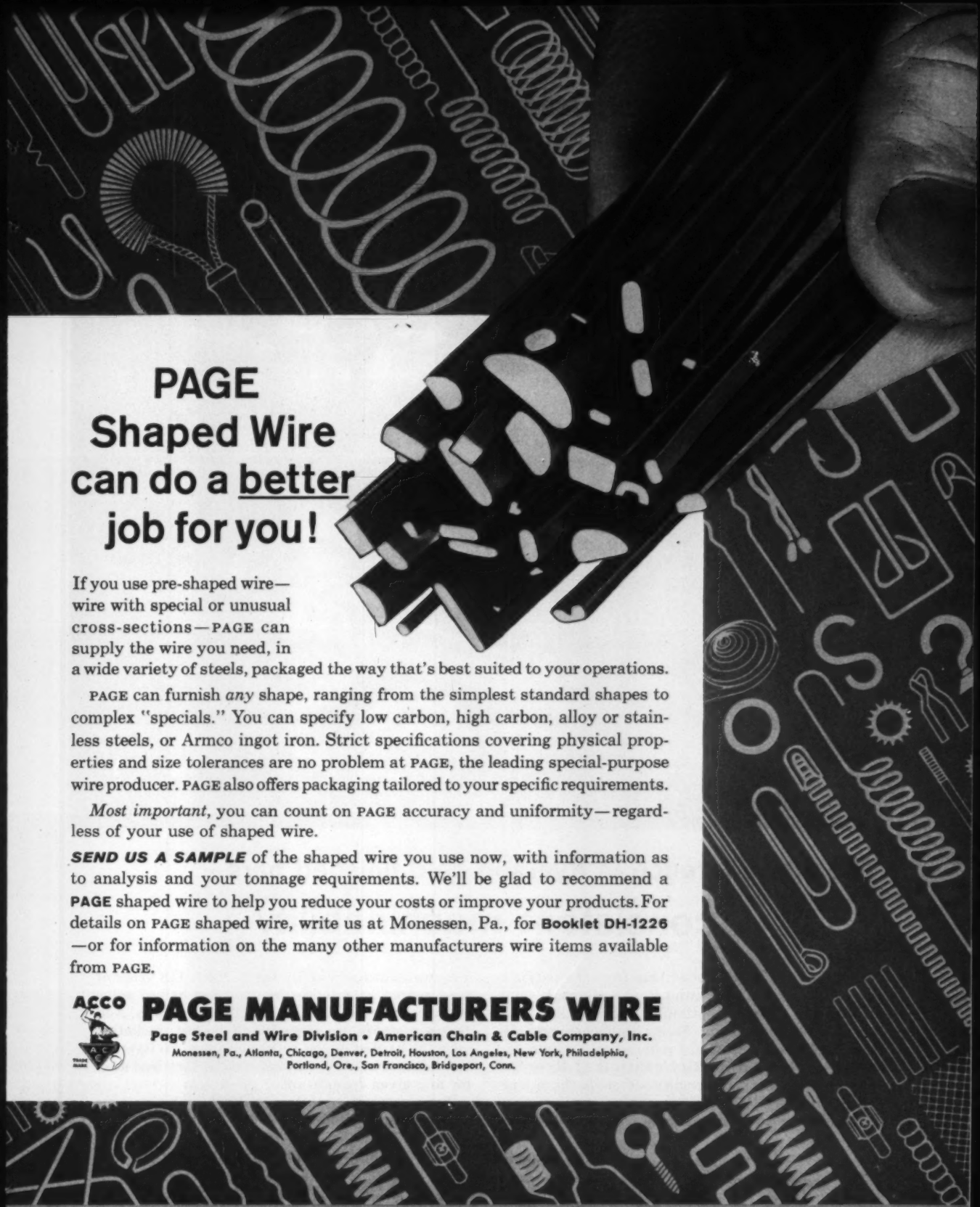

PAGE Shaped Wire can do a better job for you!

If you use pre-shaped wire—wire with special or unusual cross-sections—PAGE can supply the wire you need, in a wide variety of steels, packaged the way that's best suited to your operations.

PAGE can furnish *any* shape, ranging from the simplest standard shapes to complex "specials." You can specify low carbon, high carbon, alloy or stainless steels, or Armco ingot iron. Strict specifications covering physical properties and size tolerances are no problem at PAGE, the leading special-purpose wire producer. PAGE also offers packaging tailored to your specific requirements.

Most important, you can count on PAGE accuracy and uniformity—regardless of your use of shaped wire.

SEND US A SAMPLE of the shaped wire you use now, with information as to analysis and your tonnage requirements. We'll be glad to recommend a **PAGE** shaped wire to help you reduce your costs or improve your products. For details on PAGE shaped wire, write us at Monessen, Pa., for **Booklet DH-1226**—or for information on the many other manufacturers wire items available from PAGE.

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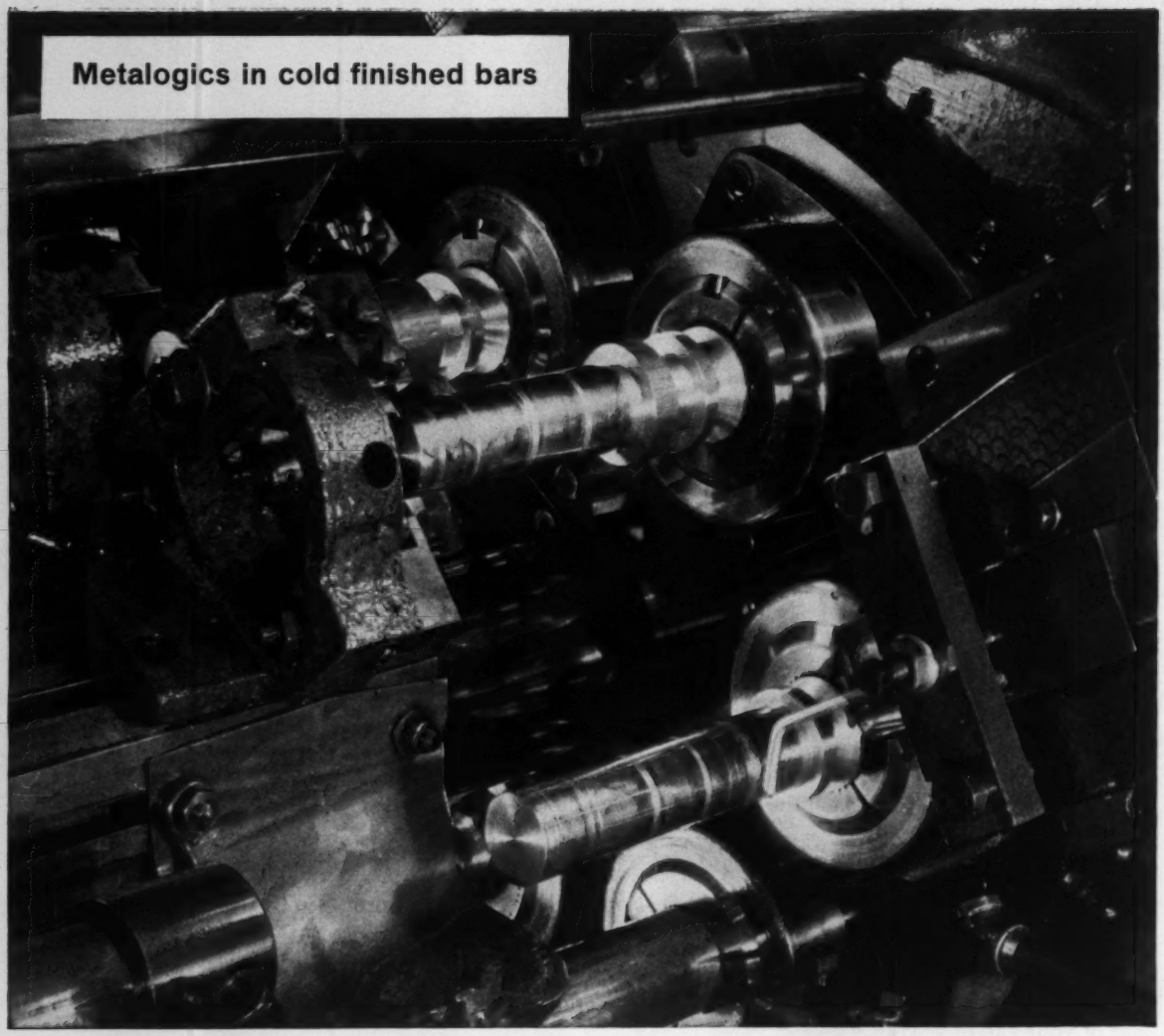
PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

PAGE *—the source for answers to wire problems*



The big difference in Ryerson cold finished bars—

consistent machinability

When you buy cold finished bars from the nation's largest supplier of steel from stock—Ryerson—you can always count on optimum machinability with dependable consistency. Setup headaches, production snarls and rejects are reduced to a minimum because the rigid quality controls of Ryerson Metalogics assure uniformity of stock from one lot to another.

In addition to this consistency, Metalogics offers you unequaled service in depth. With 118 years of steel service experience, Ryerson has helped solve every conceivable kind of machining problem. And Ryerson stocks are the nation's largest, including even the hardest-to-get types and sizes. So Ryerson specialists are able to recommend the very best steel for any given application.

For consistent optimum results . . . plus on-time delivery, be "Metalogical"—call Ryerson.

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Member of the INLAND Steel Family

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LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

June Construction Expenditures Rise Less Than Seasonally

The value of construction put in place during June totaled $4.9 billion—up 7 per cent from May (less than the normal seasonal rise), and 5 per cent below the like 1959 month. The seasonally adjusted annual rate for June equals $53.4 billion—1 per cent below the May rate. A decline in public construction accounted for most of the drop. Industrial building held at a high rate—29 per cent above the rate of June, 1959. Residential building jumped 9 per cent above the May level, but stayed 9 per cent below the year-earlier mark.

Metalworking Machinery: First Quarter Backlogs Up

The Commerce Department reports first quarter shipments and unfilled order volume of metalworking machinery:

(In Millions of dollars)	Shipments		Unfilled Orders	
	1960	1959	1960	1959
All metalworking machinery	$193.6	$196.9	$366.1	$357.3
Metal cutting types	139.2	135.4	244.9	242.0
Boring and drilling machines	23.6	23.0	37.7	40.0
Gear cutting machines	7.8	7.0	20.2	18.6
Grinding and polishing machines	28.1	30.0	53.8	48.0
Lathes	34.1	35.8	55.8	56.1
Milling machines	19.8	20.1	35.5	33.7
Metal forming types	54.4	61.5	121.5	115.3

Now We're Importing Talent

Polarad Electronics Corp., Long Island City, N. Y., instrument maker, has recruited a dozen highly specialized English engineers and technicians. The company advertised in London newspapers and sent a recruiter abroad after it found it could fill only half the available positions in this country. The firm says its response in London was "overwhelming."

J&L President Sees Imports Hurting Pipe Production

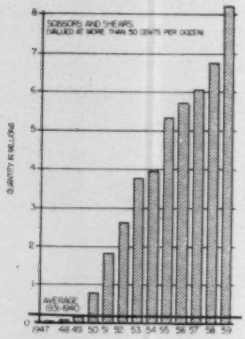
"Smaller demand for oil country pipe and tubing plus foreign competition is having an effect on domestic pipe production this year," notes Charles M. Beeghly, president, Jones & Laughlin Steel Corp. He points out that first quarter imports of pipe and tubing totaled 168,251 tons—an 80 per cent increase over 1959's first quarter—losing 3.5 million man-hours of working time for U. S. steelworkers. He doesn't expect that high rate of imports to continue, but says foreign competition is "a fact of life which labor and management in the steel industry must recognize."

Fastener Firm Tools Up to Meet Foreign Competition

Expressly to "help us meet . . . the competition presented by foreign manufacturers in the American market," Jacobson Nut Mfg. Corp., Kenilworth,

N. J., is updating its production facilities. Already installed is the first of four automatic high speed presses. The 400 ton press operates at 200 strokes a minute, uses multiple tooling to generate 5000 to 9000 nut blanks a minute. The firm is also adding an automatic, high temperature, electric furnace to bright anneal stainless steel nut blanks. It plans to double production in three years.

Will U. S. Lose Another Industry?


SCISSORS AND SHEARS VALUED AT MORE THAN 50 CENTS PER DOZEN
QUANTITY IN MILLIONS
AVERAGE 1935-1939
1947 48 49 50 51 52 53 54 55 56 57 58 59

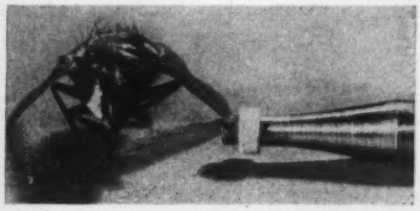
The Shears, Scissors & Manicure Implement Manufacturers Association has filed a brief with the Tariff Commission asking that import duties not be lowered again. The association is seeking to keep its industry from going the way of the sewing machine and bicycle industries. More than half the firms making scissors and shears before import duty reductions in 1950 and 1951 have stopped manufacturing. The chart shows the increase in imports of scissors and shears valued at more than 50 cents a dozen. Most come from West Germany, Italy, and Japan.

Russia Seeks U. S. Equipment to Build V-8 Auto Engines

STEEL learned exclusively last week that the Russians have asked a U. S. tool builder to bid on a $5.3 million order of "Transfer-Matic" machines to be used in the production of aluminum V-8 automobile engines. The Commerce Department has granted a license for the export of the equipment plus several thousands of dollars worth of technical data. Although the company was not named by the Commerce officials, it is believed that the inquiry went to Cross Co., Detroit. "Transfer-Matic" is a commonly used trademark of Cross Co.

House Fly Dwarfs New Grinding Wheel

This grinding wheel, made by Bay State Abrasive Products Co., Westboro, Mass., is about the size of a fly's eye. It's used in making microminiature mechanisms. The wheels are designed to lower production costs, says Bay State.



Business Barometers Point to Fair

Factory sales of transistors dropped to 9.9 million in April from a record 12 million in March, reports the Electronic Industries Association . . . May dollar sales of used machine tools rose 4 per cent above the April level, but held about 2 per cent under the year-earlier pace, says the Machinery Dealers National Association . . . May housing starts totaled 128,300 (vs. 156,000 in May, 1959), the Commerce Department reports . . . Consumer instalment credit rose $271 million (seasonally adjusted) in May, the Federal Reserve Board reports.

GE Unveils Device to Replace Transistors, Tubes

A new electronic device that will do the work of several receiving tubes or transistors has been unveiled by General Electric Co. Called "compactrons," the vacuum devices will outperform tubes and transistors, require less power, and cost less, GE claims. In the photo: The two compactrons at right replace the five miniature tubes at left. GE expects heavy usage in radios, TV sets, hi-fi equipment.

Railroads Work Hard to Wriggle Out of Wage Hike Squeeze

The nation's railroads, already hard pressed financially, will probably be hit with a $200 million addition to their annual wage costs—if all 126 classes of rail labor accept the 4 per cent wage hike recommendation of the federal arbitration panel. To get the cash, some Eastern roads are pushing for a rate increase, but other roads don't want it, feel it would lead to less freight, thus less revenue. Some roads are working on plans to boost their volume; others are checking to see where they can cut service. Whatever the end result, it will affect metalworking.

Dividends Up 7 Per Cent

Publicly reported cash dividends paid during the first five months of 1960 totaled $4.5 billion—up 7 per cent from the like 1959 period, reports the Commerce Department. Here's the breakdown, showing percentage changes:

Total	+7%	Machinery (except electrical)	+14%
Manufacturing	+5%	Electrical machinery	same
Iron & steel	+5%	Transportation equipment	−7%
Nonferrous metals	+8%	Automobiles	+6%

More 'Steelmark Days' Coming

Look for other steelmakers to underwrite celebrations similar to U. S. Steel Corp.'s successful "Steelmark Days"—carnival type, promotional events in steel producing areas to merchandise steel products at the consumer level. USS plans its third celebration for Provo, Utah, this fall. The first two were in the Bessemer-Ensley-Fairfield, Ala., area and in Gary, Ind. Each costs $10,000 to $15,000.

Figures Prove May Was Good Month

May was a good month for the durable goods industries, the Commerce Department reported last week. Sales totaled $15.3 billion (vs. $15.1 billion in April); new orders rose to $14.6 billion from $14.1 billion in April; backlogs held high at $44.6 billion (vs. $45.2 billion in April). Inventories rose to $32.3 billion—up $200,000 from April's level.

Air Freight to Garner Bigger Role

"Some manufacturers contend that jet aircraft now being offered to operators will haul freight at a direct operating cost of about 3 cents a ton mile," Prof.

Stanley H. Brewer of the University of Washington reports in "Rhochrematics— A Scientific Approach to the Management of Material Flow," a new paper available for $2 from the university's Bureau of Business Research. The professor notes that none of those plans has been purchased, but says Canadair's new CL-44 turboprops will move freight at little more than 4 cents a ton mile. "Potential savings in total movement costs via air freight will make it a serious competitor for moving many high value and perishable items," predicts Professor Brewer.

PAs See Business Holding on Plateau

The June survey of the National Association of Purchasing Agents finds: **New orders**—27 per cent report an increase; 26 per cent report a decline; **inventories**—31 per cent report lower; 18 per cent say higher; **employment**—12 per cent say higher; 25 per cent say lower; **prices**—13 per cent say lower; 11 per cent say higher.

Automation Will Discourage Incentive Pay Plans

Expect wage incentive plans to become less popular as automation increases, George B. Howell, vice president, Leece-Neville Co., Cleveland, predicts in a University of Michigan pamphlet. He points out that efficient new equipment often reduces incentive opportunity. And workers who are used to big bonuses resist the introduction of new equipment. He tells about one case where an arbitrary 15 per cent was added to machine time to give employees equivalent incentive opportunity. That was a poor management move, he says, since it seriously diluted the labor savings calculated to justify buying the new machine.

Straws in the Wind

Industrial building costs held steady during the second quarter, says Austin Co. . . . The home appliance industry's heavy inventory will adjust itself within the next 60 to 90 days, believes Judson S. Sayre, chairman, Norge Div., Borg-Warner Corp. . . . The Justice Department has filed suit to break up the recent merger of Bliss & Laughlin Inc., Harvey, Ill., with Sierra Drawn Steel Corp., Los Angeles.

Metalworking Pulse

The Business Trend: Both the steel and auto industries started preparing for the Fourth of July holiday in the preceding week, sending the industrial production index into a 7 point tailspin. The trend line will dip more for the holiday week. **Autos:** Output dropped to the year's lowest level. Reason: The holiday and initial cutbacks for model changeover. **Steel:** Production dropped to 1,218,000 tons, the lowest level for a nonstrike period since the '49 Independence holiday week.

- **INDUSTRIAL PRODUCTION**
  - Week ended July 2 .... **152†**
  - Year ago **158**
  - Details on Page 65
- **PASSENGER CAR PRODUCTION**
  - Week ended July 9... **95,000***
  - Year ago **123,147**
  - Details on Page 61
- **INGOT PRODUCTION RATE**
  - Week ended July 10 .. **42.7%†**
  - Week ago **53.0%**
  - Details on Page 136

†Preliminary. *Estimated.

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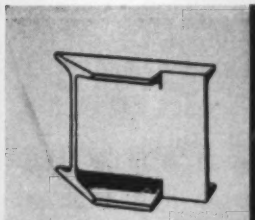
"The One Machine We Couldn't Do Without"

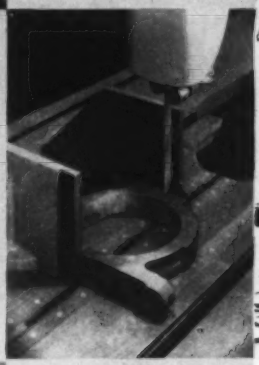


COPING AND MITERING HEAVY STRUCTURAL SHAPE

18" Beam (above) is held between vises for the short cut. On the long cut (left) vises were removed and beam held by simple clamp. The MARVEL Band Saw is truly indispensable in ornamental and structural iron shops where this type of work is done daily. The machine will cut-off square, miter and cope any work shape from the smallest moulding to 18" I-beams.

SPLITTING CLAMP RINGS, BUSHINGS

Splitting clamp rings, connecting rods, bushings and collets is a fast, simple operation on the No. 8 Band Saw. Perfect control, quick chucking facilities, accuracy and speed are features that especially fit the machine to handle this type of work.

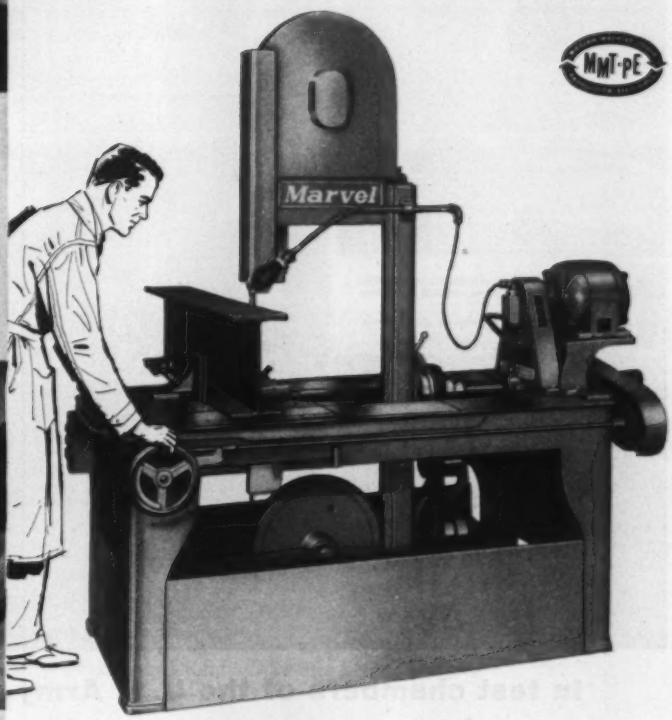


MITERING LARGE DIAMETER PIPE

Pipe (or any bar shape) may be mitered at a 45° angle without the need for special jigs or fixtures. Even when cutting miters, work remains in the same position as it does for straight cuts. Column and blade are instantly tilted to desired angle, even without stopping the machine. Perfect miters (or lesser angles) are sawed without any layout or special equipment.

SEGMENTING LARGE DIE BLOCK

Three equally spaced re-entrant cuts were made in this 16" x 18" SAE 4130 Forging. Job was completed, floor-to-floor in 5 hours. No special jigs or fixtures were required. An unusual job that serves to emphasize the versatility of the MARVEL No. 8 Saw.



"As simple to use and handy as a Scout Knife" is the way another user described his MARVEL No. 8 Universal Band Saw recently . . . and we can't think of a better way to describe this versatile metal cutting machine.

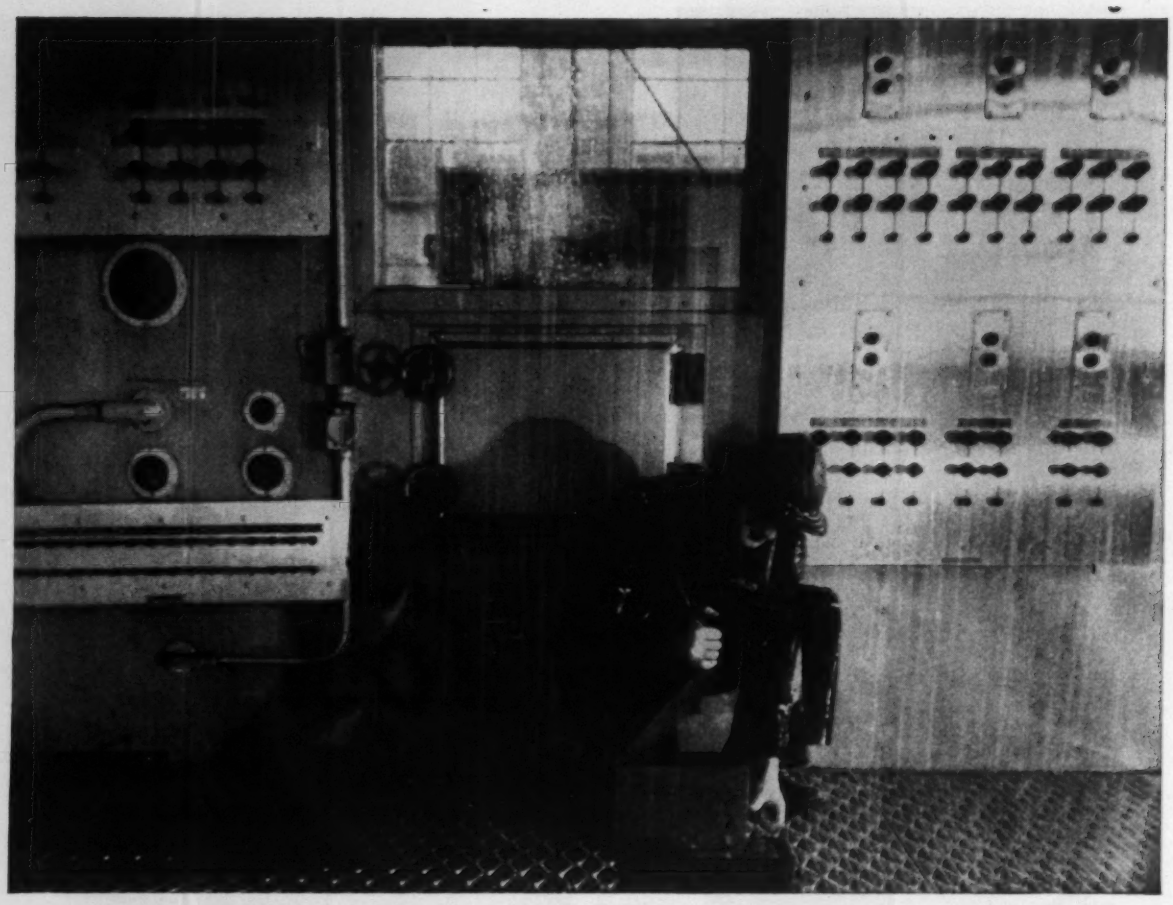
With a MARVEL No. 8 Band Saw, you can do almost any conceivable straight, angle, or miter metal sawing job—from cutting-off bar stock to making the most unusual forming cuts. You can handle small, delicate work, and in the next minute, saw structurals, or segment large work as illustrated in the lower photograph. You will save time, labor, and material with a MARVEL No. 8 Band Saw because no other saw has all the features to be had in this truly universal tool.

Upright column design and forward travel of the blade through the work (which remains stationary on the table-height saw bed) provides easy, unobstructed visibility and more convenient and efficient working conditions; column can be tilted and locked at any angle up to 45° left and right of vertical; the exclusive MARVEL Power Feed with Automatic Overload Relief; Automatic cutting-depth stops; simple, convenient operating controls—these are some of the features which make the No. 8 Band Saw the most useful—and used—metal cutting saw on the market.

For the complete story, ask or write for Bulletin 875 which illustrates and describes MARVEL Universal Metal Cutting Band Saws.

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave. • Chicago 39, Ill.



In test chambers of the U. S. Army...

Nickel meets the torture of man-made weather

Sometimes it's as steaming as the Malayan jungle...sometimes as hot as the Sahara...and then an arctic storm blows in. Nowhere in the world does Nature brew up such changeable weather as men do in Philadelphia.

Here in weather chambers of the U.S. Army, military equipment undergoes weather conditions that make Mother Nature seem like a gentle old soul by comparison.

If you think this is tough on the equipment, how about the chambers themselves. The equipment is in and out, but the chamber has to take it for test after test. That's why the designers line them with a Nickel Stainless Steel—Type 18-8. Nickel Stainless Steel *can* take it. It's corrosion resisting in the wettest atmosphere. It withstands sub-zero temperatures. The shocks of see-sawing "weather" conditions harm it not at all.

Still another Nickel alloy—a nickel-chromium type — lines heat test units where temperatures get up over 1200°F. Another nickel-chromium alloy is used for the glowing heating elements.

Make your own forecast of what a metal must face—Nickel and its alloys can help you meet the challenge. Is it ability to meet stress, fatigue, heat or cold, corrosive atmospheres or a combination of these? We may be able to help you find the answer in Nickel. Just write.

Weather chambers like this one designed by Tenney Engineering, Inc., Union, N. J., are lined with Nickel Stainless Steel. Notable installations include those at the U. S. Army's Frankford Arsenal, and Sperry Gyroscope Company, Long Island, N. Y.

The International Nickel Company, Inc. INCO **67 Wall Street · New York 5, N. Y.**

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Lesson from Toshiba

We have just returned from watching a movie, "Toshiba in Progress." It depicts the products and manufacturing processes of the Japanese counterpart of General Electric or Westinghouse. Toshiba makes a wide range of electric items—from lamps to locomotives. Its equipment techniques and product quality compare favorably with the best in this country, or anywhere in the world.

The picture is one to shake the complacency of any American metalworking manager inclined to shrug off the threat of foreign competition.

The group we were with milled about uneasily outside the projection room and discussed the movie in muted tones. They agreed the Japanese have made fabulous progress in a very few years. They also agreed the Japanese possess outstanding advantages in four areas:

First, their wage rates and labor costs are far below ours. That is and will continue to be a most important factor.

Second, their equipment and technology is good and is getting better. Their progress in research and development work is excellent. We no longer have a corner on knowhow.

Third, they have an intangible, psychological advantage over us. It is the advantage of the underdog. It is the desire of the have nots to cross over into the land of the haves. The Japanese do not have popup toasters and refrigerators and autos as we have. But they want them. And they are willing to work hard to obtain them. They have an intense desire to win.

Fourth, they are sharpening their marketing. They are upping their quality. Where the "Made in Japan" label once suggested gimcrackery and cheapness, it is evolving into an image of quality.

What is said of the Japanese can be said in varying degrees about the Germans, the French, and other Western Europeans.

Japan (and other countries) have taken many lessons from us. They have received great help from this country.

The Toshiba story suggests we soon must learn some lessons from our competitors abroad in equipping for production efficiency, in automatic manufacturing, in intensifying research and development, in marketing, in quality control, and perhaps most importantly, in the will to excel.

Walter J. Campbell

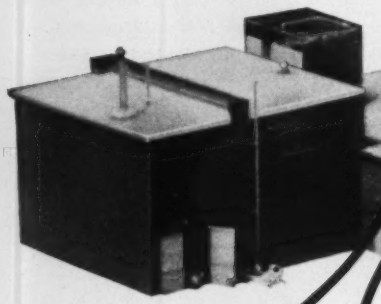
EDITOR

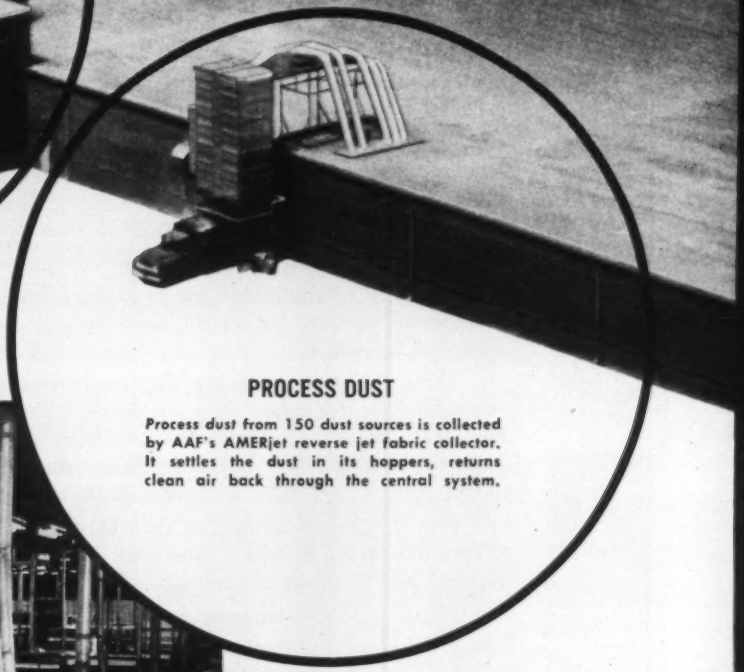
AAF clean-air engineering makes

...*despite*

ATMOSPHERIC DUST

Atmospheric dust **is taken out of the intake air by AAF's Roll-O-Matic air filter located in the air conditioning apparatus room. Recirculated ventilation air also is continuously cleaned by the Roll-O-Matic.**





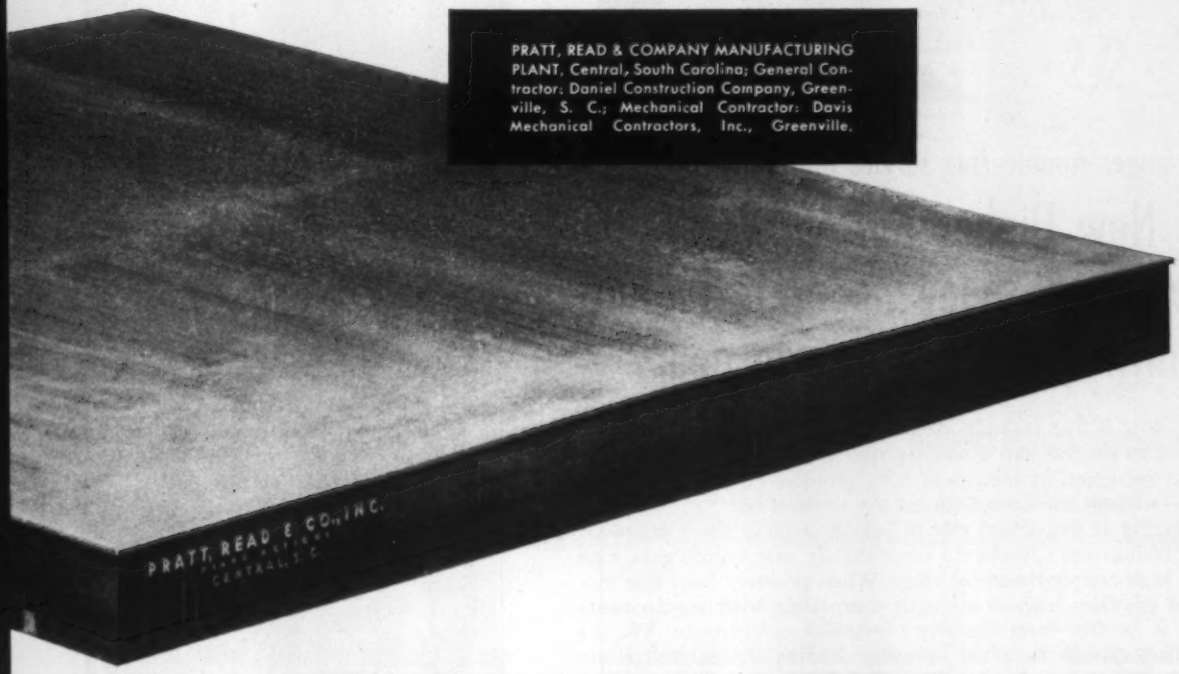
PROCESS DUST

Process dust **from 150 dust sources is collected by AAF's AMERjet reverse jet fabric collector. It settles the dust in its hoppers, returns clean air back through the central system.**

Interior of plant showing multitude of dust-producing operations.

air conditioning practical here...

150 dust-producing operations going full blast!



PRATT, READ & COMPANY MANUFACTURING PLANT, Central, South Carolina; General Contractor: Daniel Construction Company, Greenville, S. C.; Mechanical Contractor: Davis Mechanical Contractors, Inc., Greenville.

AAF system permits air recirculation, slashes heating-cooling, maintenance costs

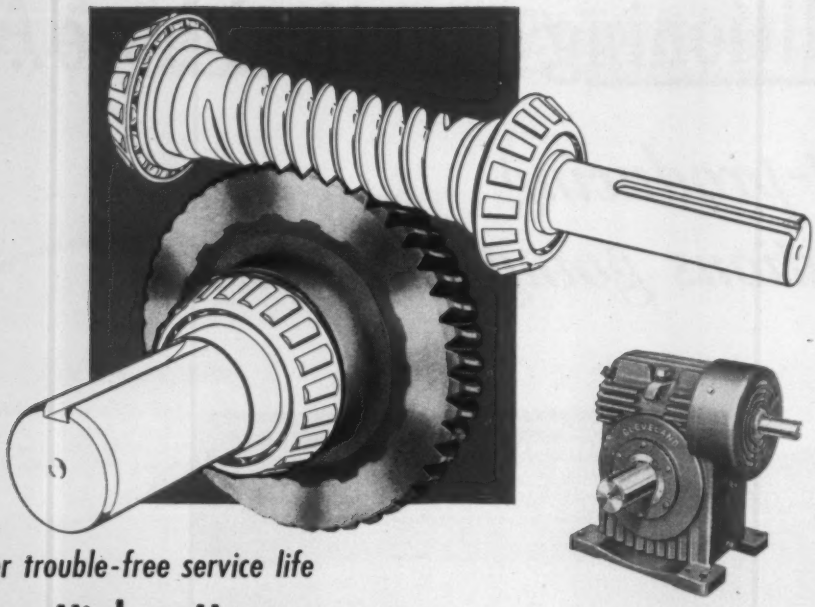
Pratt, Read & Company, manufacturers of piano keys and actions, wanted its new Central, South Carolina plant to be air conditioned. Reasons: better working environment for its people and improved quality of its products. Problem: the fact that 150 dust-producing operations would be going at full throttle during the working day.

AAF's air engineering knowhow, plus its complete line of air-cleaning products (for both atmospheric and process dust) made air conditioning practical by providing for money-saving recirculation of air. The savings: plenty—lower heating costs in winter, vastly lower cooling costs in summer, and a big savings in plant cleaning costs.

For a look at what we mean by a really *complete* line of equipment, call your local AAF representative or write direct for Bulletin 518. Address: Mr. Robert Moore, American Air Filter Company, Inc., 443 Central Ave., Louisville, Ky.

AAF **American Air Filter**

BETTER AIR IS OUR BUSINESS



for longer trouble-free service life

...New Higher Horsepower Cleveland Speed Reducers feature centrifugally cast bronze gears

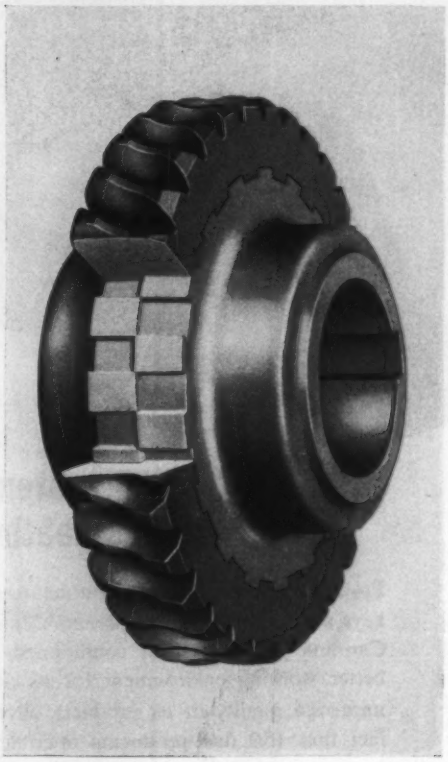
Providing higher input horsepower and output torque ratings, *New* Cleveland Speed Reducers now give industry dependable speed reduction at savings of 50% or more on per horsepower cost—without increasing size of the units.

Playing an important role in helping achieve these improved new ratings are Cleveland's centrifugally cast bronze gear rims of a high copper-tin-nickel alloy. When properly cast, this material provides highest strength compatible with requirements that it be free from abrasive crystalline components. Yet it's yielding enough to avoid excessive loading stress localization, while affording a low coefficient of friction against hardened steel—providing increased resistance to wear and fatigue pitting.

These rugged bronze rims are cast integrally with their supporting cast iron hubs (see photo at right). Checkered hub circumference holds the rim securely in position, making the two members independent of actual surface bond.

Also, another plus value of the New Cleveland Reducers is their especially large gear shaft diameters—which provide greatly increased overhung load carrying capacity.

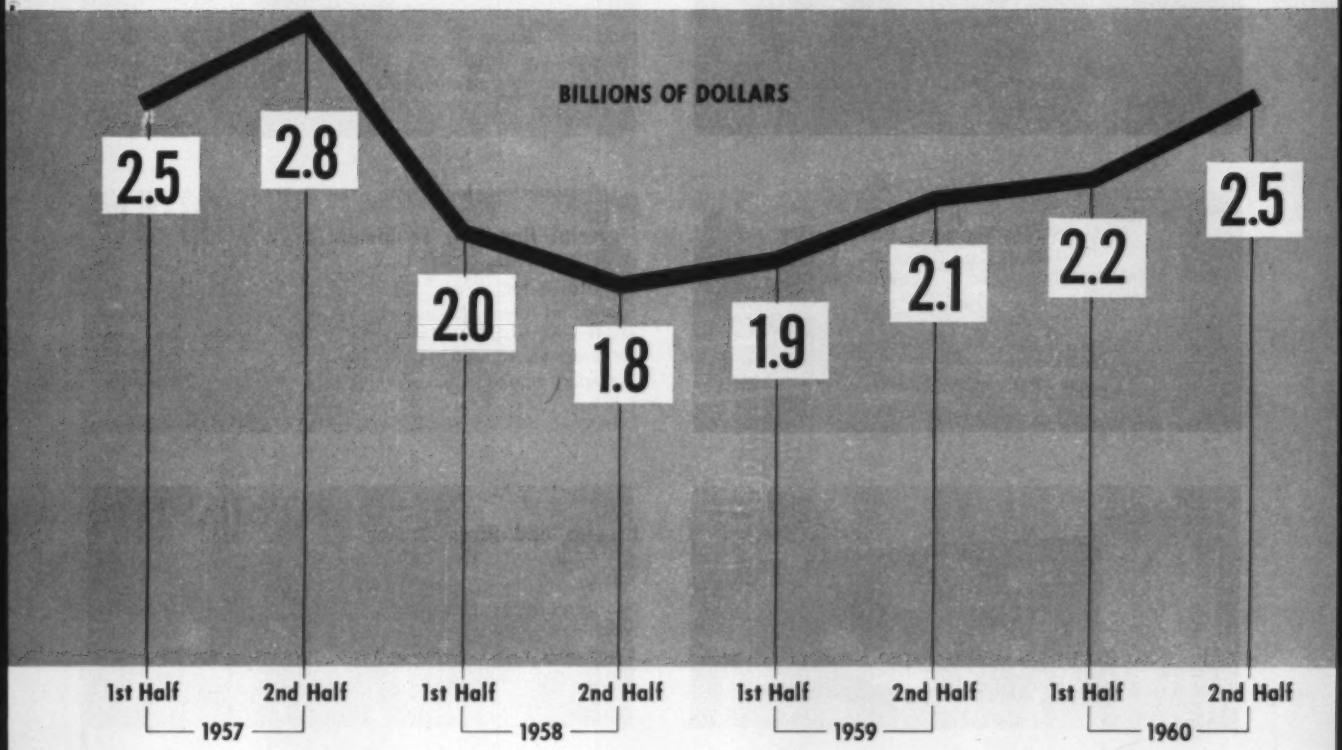
For complete facts on this New Cleveland Speed Reducer Line, consult your local Cleveland Representative. Or, write us direct for free Bulletin No. 405—it gives *complete* engineering information for designers and engineers.



CLEVELAND
Worm Gear
Speed Reducers

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

STEEL Checks Metalworking's Equipment Ordering Plans . . .



Buying Turns Up in Second Half

Metalworking companies will order 13.6 per cent more equipment (dollar volume) during the second half than they did in the first six months. They'll buy 17.5 per cent more equipment in 1960 than they did in '59.

IF YOU BUY capital equipment, try to squeeze more dollars into your budget. Reason: Your competitors are tooling up for efficiency, STEEL's latest survey of equipment ordering plans shows (see table on Page 48).

IF YOU SELL capital equipment, prepare for a higher volume of orders in the second half than you got in the first. The range: Metalworking will buy 5 per cent more material handling equipment, 17 per cent more heat treating equipment and foundry equipment in the second half than in the first (see tables on Pages 46-47).

IF YOU SUPPLY equipment builders, you can look for a noticeable order uptrend in the next six months.

IF YOU PLAN to maintain a high level of spending in 1961, you'll have plenty of company. STEEL's survey finds that metalworking already plans to order as much equipment in the first half of 1961 as in the first six months of 1960. So the race for higher productivity will continue.

The companies that buy about one-third of all capital equipment purchased by metalworking told STEEL, confidentially, their equipment ordering plans—on which this report is based.

• **Cutbacks in '60**—The metalworking industries will spend nearly $1

Who'll Buy What in 2nd Half

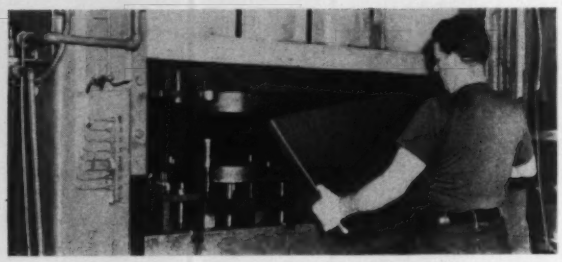
Tables show planned order increases (in dollar volume) for each industry by type of equipment

Machine Tools . . . . . Up 16%

Primary metals (S.I.C. 33)	28% More
Fabricated metal products (S.I.C. 34)	4% More
Machinery, except electrical (S.I.C. 35)	5% Less
Electrical equipment (S.I.C. 36)	3% Less
Transportation equipment (S.I.C. 37)	24% More

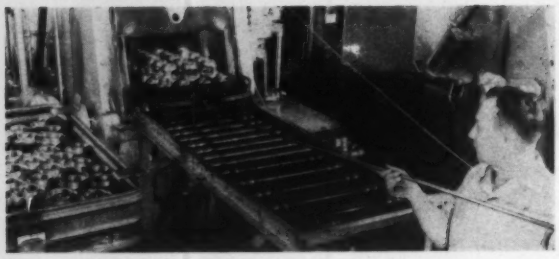
Material Handling Equipment . . . . . Up 5%

Primary metals (S.I.C. 33)	18% Less
Fabricated metal products (S.I.C. 34)	9% Less
Machinery, except electrical (S.I.C. 35)	2% Less
Electrical equipment (S.I.C. 36)	6% More
Transportation equipment (S.I.C. 37)	24% More



Presses and Press Brakes . . . . . Up 11%

Primary metals (S.I.C. 33)	4% Less
Fabricated metal products (S.I.C. 34)	19% More
Machinery, except electrical (S.I.C. 35)	13% More
Electrical equipment (S.I.C. 36)	14% More
Transportation equipment (S.I.C. 37)	7% More



Heat Treating Equipment . . . . . Up 17%

Primary metals (S.I.C. 33)	29% More
Fabricated metal products (S.I.C. 34)	13% More
Machinery, except electrical (S.I.C. 35)	6% More
Electrical equipment (S.I.C. 36)	8% Less
Transportation equipment (S.I.C. 37)	21% More

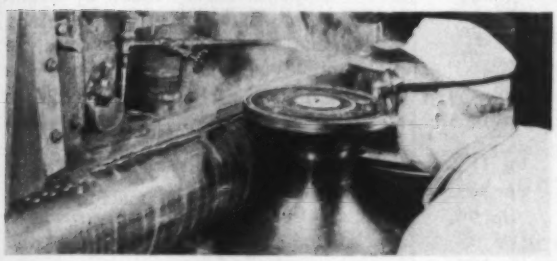
billion less for capital equipment this year than was indicated in their plans last December. Many reasons are offered for the cutback, but these stand out: 1. The economy didn't reach the heights predicted at the beginning of the year. 2. Money remained hard to get for longer than had been anticipated. 3. Some firms postponed purchases indefinitely—waiting to see which way their sales trends would turn.

• **Need Is Great**—While equipment ordering this year will be at one of the highest levels on record, it will lag far behind metalworking's needs. Six months ago, a STEEL survey (asking a hypothetical question) found that metalworking companies would buy $20.7 billion worth of new equipment this year, if funds were unlimited. The industry will fall $16 billion short of its needs. That's a serious deficit for several reasons:

1. Foreign competitors, who are constantly winning sales away from U. S. firms, have decidedly more efficient facilities, in many cases.

Cleaning & Finishing Equipment . . Up 14%

Primary metals (S.I.C. 33)	23% More
Fabricated metal products (S.I.C. 34)	21% More
Machinery, except electrical (S.I.C. 35)	19% More
Electrical equipment (S.I.C. 36)	18% More
Transportation equipment (S.I.C. 37)	8% Less



Joining & Assembly Equipment . . . Up 16%

Primary metals (S.I.C. 33)	24% More
Fabricated metal products (S.I.C. 34)	11% Less
Machinery, except electrical (S.I.C. 35)	9% More
Electrical equipment (S.I.C. 36)	14% More
Transportation equipment (S.I.C. 37)	4% More

Testing and Inspection Equipment . . . Up 7%

Primary metals (S.I.C. 33)	19% Less
Fabricated metal products (S.I.C. 34)	20% More
Machinery, except electrical (S.I.C. 35)	9% More
Electrical equipment (S.I.C. 36)	7% More
Transportation equipment (S.I.C. 37)	5% More

Office Equipment . . . . . Up 8%

Primary metals (S.I.C. 33)	4% Less
Fabricated metal products (S.I.C. 34)	11% More
Machinery, except electrical (S.I.C. 35)	10% More
Electrical equipment (S.I.C. 36)	2% Less
Transportation equipment (S.I.C. 37)	2% More

Steelmaking equipment...Down 7%

Foundry equipment . . . . . Up 17%

2. Price competition promises to remain severe for the foreseeable future. One of the few ways to boost profits while caught in a price fight is through the use of more productive machinery.

3. Inflation still looms as one of the nation's most serious long term problems. Its effects can be minimized through production efficiency.

4. Competition between rival materials and products promises to become even more intense.

5. Profit margins in many segments of metalworking are far from adequate. To attract the investment capital needed to expand to meet the rising markets of the decade ahead, metalworking must widen its profit margins. One effective approach is the purchase of more efficient capital equipment.

• **Emphasis on Efficiency**—Metalworking is recognizing the need for greater production efficiency. STEEL estimates that around $3 of every $4 metalworking will spend for equipment this year will be keyed to modernization. The industry

2nd Half Order Trend, by Industries

Dollar volume of equipment orders to be placed in 2nd half, 1960, vs. 1st half

PRIMARY METALS (S.I.C. 33)	**Up 7%**
Steelmaking (S.I.C. 3312)	Up 2%
Foundries (S.I.C. 332)	Up 18%
Nonferrous (S.I.C. 333, 334, 335)	Up 10%
FABRICATED METAL PRODUCTS (S.I.C. 34)	**Up 9%**
MACHINERY, EXCEPT ELECTRICAL (S.I.C. 35)	**Up 7%**
Farm equipment (S.I.C. 352)	Up 8%
Machine tools (S.I.C. 3541)	Down 2%
General industry machinery (S.I.C. 356)	Up 7%
Office machines (S.I.C. 3579)	Up 16%
ELECTRICAL EQUIPMENT (S.I.C. 36)	**Up 11%**
Electrical industrial apparatus (S.I.C. 361)	Up 11%
Electrical appliances (S.I.C. 3621)	Up 9%
TRANSPORTATION EQUIPMENT (S.I.C. 37)	**Up 19%**
Motor vehicles & parts (S.I.C. 3717)	Up 21%
Aircraft & parts (S.I.C. 372)	Up 20%
Railroad equipment (S.I.C. 3742)	Down 6%
ALL METALWORKING	**Up 12%**

must do a more effective replacement job if it is to meet the dual threat of foreign competition and inflation. STEEL asked the nation's leading capital equipment builders to list companies that are doing an especially effective job of replacing production equipment; the builders could mention only 90 companies—out of around 30,000 metalworking plants in the country employing 20 or more.

• **Where Dollars Will Go** — All types of equipment will play important roles in metalworking's struggle for productivity improvements in the second half of 1960. Percentagewise, foundry equipment and heat treating equipment will see the biggest increases in buying — the dollar volume of orders for both types in the second half will rise 17 per cent above the level of the first six months.

Metalworking will order 16 per cent more machine tools in the second half than in the first—with the bulk of the orders coming in the last quarter.

A special survey made by STEEL discovers that 1 in 4 metalworking plants is postponing the ordering of capital equipment until after The Machine Tool Exposition—1960, in Chicago, Sept. 6-16. The buyers want to see the new items to be exhibited there before committing themselves for new machines.

• **Who Big Spenders Are** — Makers of transportation equipment—especially the auto and aircraft industries—are leading the second half spending spree. Makers of autos and parts will be heavy buyers of machine tools and material handling equipment. So will aircraft and missile manufacturers.

The electrical equipment industry will continue its steady uptrend of equipment buying.

Foundries are getting set for one of their biggest buying sprees in recent years. They'll spend 18 per cent more in the second half than in the first. But that doesn't signal an exceptionally good year for producers of foundry equipment, since the increase starts from a low order level during the first six months of this year.

• **A Peek at '61**—STEEL asked its respondents what dollar volume of orders they would place for capital equipment during the first six months of 1961. Their answers are not encouraging: They predict a 12 per cent drop from the second half, 1960, level. But those plans are subject to considerable change. STEEL will conduct another survey of spending plans for 1961's first half in December—and report it in an early January issue.

Early Plans Show Drop in 1961

STEEL asked for preliminary estimates of dollar volume of orders for equipment to be placed during the first half of 1961. The results:

1st Half, 1961, vs. 2nd Half, 1960	
Primary metals (S.I.C. 33)	12% Less
Fabricated metal products (S.I.C. 34)	6% Less
Machinery, except electrical (S.I.C. 35)	15% Less
Electrical equipment (S.I.C. 36)	5% Less
Transportation equipment (S.I.C. 37)	21% Less
ALL METALWORKING	**12% Less**

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

Sound Off on Depreciation Reform

COMPANY PRESIDENTS have received the Treasury Department's long awaited depreciation survey.

"Now it's up to American industry," comments a Treasury official. "If we get enough answers by Sept. 1, we hope to have the replies computed on a Univac by the first of the year." The department will use the answers to help formulate new depreciation policy. On the legislative side, the House Ways & Means and Joint Internal Revenue Committees will get into the act when Congress returns in 1961.

Treasury Department has just mailed questionnaires seeking views of 6000 industrialists on depreciation practices. Your replies may help get much needed reform—which STEEL has been crusading for since 1953. If you receive a form, please answer it. Sample questions:

- What new methods of depreciation are you using? Double declining balance? Sum of the years digits? Other?
- Do you think present allowances for depreciation are reasonably satisfactory?
- How much more depreciation would have met your requirements last year?
- Why are depreciation deductions inadequate? Useful lives too long? Change in price levels? Inadequate allowance during early years? Other?
- Would liberalized depreciation influence your investment decisions?

• **Broad Survey**—About 600 U. S. firms are being questioned about their depreciation practices and recommendations for liberalization of depreciation regulations. Treasury is surveying 2700 larger corporations. The Small Business Administration is covering 3300 small firms. Fred C. Scribner, undersecretary of the Treasury, assures respondents that their replies will be confidential.

Sen. Harry F. Byrd (D., Va.) chairman of the Internal Revenue and Finance Committees, points out that Congress has had great difficulty in evaluating proposed changes in our depreciation laws because of lack of statistical information about current practices. If industry cooperates, the survey will give U. S. legislators and administrators that data.

• **Need to Reply**—Treasury officials report that the great majority of its 2700 questionnaires must be answered to give the study validity. At least 40 per cent of the SBA's forms should be returned.

That will be a tall order. Some companies will have to break down their accounting categories. Others will have to lump detailed categories together to fit the classifications set in the survey.

• **Promising** — But Washington is optimistic about co-operation. Of 26 firms checked earlier this year in a pilot study, 25 came back with complete replies.

Besides the questionnaire, you will be asked to fill out a "business activity" schedule to be used by Treasury in evaluating the replies. Of the 54 categories of activity, you will check all which account for at least 10 per cent of the depreciable assets of your whole business. If it is convenient to report activities which constitute less than 10 per cent of your whole business, you are asked to do so. The survey is seven or more pages long, depending upon how many different business activities you are engaged in.

• **Justification**—The administration wants to find out if more liberal depreciation laws will foster faster re-equipment and, consequently, greater economic growth. If it gets that assurance as a result of the questionnaire returns, it will probably support full-scale depreciation reform. Its reasoning: The added tax revenues resulting from the long term economic growth fostered by the reform will offset or more than offset the expected short term revenue losses the changes will bring.

Despite their inadequacy, depreciation reserves even now are a growing source for capital investment funds. They are more important today than retained earnings of U. S. corporations. In 1948, depreciation taken by corporations was $6.2 billion compared with $12.5 billion in retained earnings. In 1959, retained earnings dropped to $10 billion, while depreciation leaped to $20.5 billion.

How to Organize a Successful Pool

1. Members must have specific ideas of the product they can make or the R&D area they wish to work in.
2. Care should be taken to avoid too loose an organization, even though individual members may be jealous of their positions.
3. Facilities of the members should complement each other. (A typical group might include a foundry, machine shop, sheet metal fabricator, welding shop, and a plating and finishing shop.)
4. A full-time manager should be designated with knowhow in getting defense business.
5. Written agreements on responsibility of each member should be drawn up.
6. Financing for pool activities should be obtained before organizing.
7. Because the pool will be seeking contracts larger than any of its members could handle alone, the pool should have or be able to obtain engineering assistance, sales planning aids, and market analysis techniques.
8. Ideally, members should be located near each other.
9. Centralized billings and collections and cost analysis should be maintained.
10. Member discipline should be demanded once initial agreements on over-all policies have been signed.

What Makes a Small Business Pool Click?

THE SMALL business pool program appears to be floundering. Only ten are in operation; only two of them have ever received any defense contracts, reports Ernest W. Reisner, chief, Production Assistance Division, Small Business Administration.

• **Poor Record**—That's a poor record for what has been a widely heralded program designed to enable small firms to effectively compete with large companies for defense contracts.

Most sources STEEL checked agree the trouble is not with the pools themselves. John F. Woog, executive vice president, Electrodyne Industries Inc., Garden City, N. Y., notes his group of four small electronic companies has never actually been in operation, although it was organized in 1958. The pool was set up to handle contracts too large for one of the members to handle alone; however, no work demanding the capabilities of the four firms has come to Electrodyne's attention. In the meantime, the members separately gain about 90 per cent of their sales from defense-work, and business is good.

Mr. Woog believes tremendous competition among defense contractors accounts for some of the pools' lack of success. If defense business increases substantially in the next few years, he suggests the pools will get their share of business, if they can bid competitively. He notes a number of inquiries from small business firms interested in establishing pools themselves, so concludes there is nothing wrong with the program which more business wouldn't cure.

• **Who Takes the Blame?**—Management responsibility is the major area of question about pools. A source close to Pentagon contracting practices asks: "Who takes the blame for failure to deliver on time or live up to contract specifications?" He believes military contracting officers to be reluctant to award contracts to comparatively loose knit groups where responsibility is difficult to fix. "The center of responsibility is not commensurate with the size of the contract," he sums up. It has often been said that good management is small business' biggest problem. With pools, the problem would appear to be unduly enlarged.

Jay Lawrence, general manager, Allied Specialties Co., Philadelphia,

concurs. His pool is termed one of the most successful by the Small Business Administration—Allied has been successful in getting 418 contracts worth close to $1.5 million for its members in its nearly ten years of operation.

"Success hinges on two factors," emphasizes Mr. Lawrence. "First, administration of the pool should be handled by an executive who has no affiliation with any of the pool member firms. Secondly, the pool should be organized so that financial responsibility is specifically established and spelled out among the firms participating in the contracts."

James Robertson of the Defense Department's Office of Small Business Policy disagrees with the point about military contracting officers: It is Defense Department policy that pools are authorized to receive contracts in the same sense that any firm, large or small, receives them. The pool must simply meet the same financial and technical requirements any other contractor meets.

"If there is any doubt about capabilities, SBA will issue a certificate of competence on the pool," he says.

● **No Special Aids**—While Defense and SBA co-operate on the many small business programs, no special attention is paid to pools. They are in the same category as any small firm.

With Congressional interest in the program picking up, legislation might be considered which would force the pools' existence upon the attention of contracting officers. One source suggests some sort of set-aside program might be developed if the pools expressed interest.

A Pentagon source thinks the pools' lack of success is "a psychological thing." They were formed with dreams of big contracts just over the horizon; then learned fast that competition for defense-work was still the dominant factor. Thus many pools have lost interest in bidding, especially on contracts not big enough to use facilities of all the members.

● **Production Control**—A Senate Small Business Committee spokesman believes the division of responsibility works against the pools. He suggests the military services might contract more with small firms as "associate" contractors on the same project. Each firm would be directly liable for its share of the work.

It takes good management to co-ordinate the efforts of several companies on one contract, especially when dealing with new developments in military weapons technology. Routine, off the shelf items would seem best suited for the pools to work on.

● **R&D Pools**—The latest chapter in the pool concept is the Small Business Act of 1958 calling for the establishment of research and development pools among small firms, which alone could not hope to compete with large corporations for R&D contracts. Two of the production pools listed on this page are also R&D pools. No separate R&D pools have been set up, although SBA cites continued interest in the idea.

Increased ability to undertake R&D work is regarded as important to the future of small companies in the defense field, because the firm with the most experience in a new field is certain to have the jump on production contracts of new weapons.

● **Organizing a Pool**—If you are thinking of forming a pool, you must be ready to deal with some red tape in getting federal approval, says Mr. Reisner. The Justice Department and the Federal Trade Commission will check to see that the pool arrangement won't violate antitrust laws. Walsh-Healey Public Contracts Act regulations on wages and hours must be met too.

SBA's approval does not amount to government sponsorship, but the agency does seek to advise the pool where it can on how to obtain contracts.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Who's Who in Small Business Pools . . .

Name	Number of companies	Director
Allied Construction Contractors, Joliet, Ill.	5	**John Krypel,** secretary
Allied Specialties Co., Philadelphia	13	**Jay Lawrence,** general manager
Applied Research Associates Inc., Albuquerque, N. Mex.*	4	**E. D. Nunns,** president
Astro Age Industries Inc., Los Angeles	4	
Electrodyne Industries Inc., Garden City, N. Y.	4	**John F. Woog,** executive vice president
Huntington Production Pool, Huntington, W. Va.	12	**Conley H. Dillon,** consultant
Production Research Engineering Pool Corp., North Hollywood, Calif.	16	**Harvey Stowers,** executive director
Spec Products, Denver*	3	**John F. Sweeney,** president
Unified Industries Inc., North Hollywood, Calif.	11	**Rinard W. Flint,** president
Unitized Industries Inc., Houston	3	**Wendell Carlsen,** president

*Approved R&D pool, as well as production pool.
Source: Small Business Administration.

Keen Interest in Tariffs... Industry Wins Long Sought Rule in Renegotiation... FTC's Attitude Gets Tougher

● **TRADE HEARINGS PLAY TO OVERFLOW CROWD**—Industry has responded to Tariff Commission and Committee for Reciprocity Information (CRI) invitations to speak out on tariff matters to be discussed at the September meeting on the General Agreement on Trade and Tariffs (STEEL, June 6, p. 60).

Public hearings by the two groups begin today (July 11) in Washington. At least 400 requests to be heard have been received by the Tariff Commission. It is holding "peril point" investigations of the products on the State Department's "bargaining list."

A peril point is the point beyond which a duty cut would harm domestic producers. The CRI is reportedly knee deep in comments about concessions American industry feels foreign countries must make to U. S. exports.

Many Washington observers are increasingly pessimistic about our chances for gaining significant concessions overseas. They don't expect the rapidly growing protectionist sentiment here to go unnoticed by the Europeans and Japanese.

● **RENEGOTIATION BOARD ACTIVITIES EXPOSED**—The U. S. Court of Appeals has handed down a decision in a 1952 renegotiation of defense profits case involving Boeing Airplane Co., Seattle. It is described by observers here as "precedent setting" because it overrules Board Chairman Thomas Coggeshall's contention that the board need not reveal all its documents to either Boeing or the U. S. tax court to which Boeing appealed the board's order to refund $10 million in defense contract profits.

When a firm appeals a decision to the tax court the case is *de novo* (that means the board's determination is not reviewed; all evidence is presented anew). Because the court has the right to agree or disagree with the board and change the monetary refund any way it sees fit, the appeals judge figured the tax court must know all relevant facts about the case, even though they were developed by board sources and intended only for the board's use. Industry has long sought such a ruling. The Renegotiation Board is expected to carry its fight for secrecy to the U. S. Supreme Court.

● **MATERIALS RESEARCH CONTRACTS SET**—The Defense Department has asked three universities (Cornell, Pennsylvania, and Northwestern) to begin the basic research needed to develop new materials capable of meeting the fantastic demands of modern weapons systems. Project Pontus will establish laboratories at the universities (and others later) at a cost of $13.9 million over a four year period.

The establishment of the university center is another step in the Advanced Research Projects Agency's effort to expand military interest in basic research, particularly in metallurgy, ceramics, solid state physics, and chemistry. Perhaps $100 million a year is now spent by Defense on basic research.

● **FTC GETS TOUGHER IN 1960**—The Federal Trade Commission set all-time records for complaints and orders against illegal business practices in the fiscal year just ended. In 1960, FTC issued 157 antimonopoly complaints compared with 80 in fiscal 1959 and an average 41 complaints a year from 1949 through 1958. The agency issued 348 deceptive practices complaints in 1960 compared with 272 in 1959 and a ten year annual average of 119.

Eleven of the antimonopoly complaints in 1960 involved mergers compared with three in 1959.

● **AIR POLLUTION LAW MAY GET ACTION**—When Congress returns from its convention recess in August, the House will take up S. 3108, a Senate-passed bill which strengthens the federal government's role in air pollution. The surgeon general of the U. S. Public Health Service will be authorized to hold public hearings on air pollution problems when he believes they are of more than local significance.

Sen. Thomas H. Kuchel (R., Calif.), a longtime proponent of pollution control, comments: "The bill would not give them any federal agency, any regulatory, or police powers. Five man groups could be set up, including representatives of the public and affected or concerned industries, to look into and report on causes of objectionable air pollution, progress toward abatement, and further steps which might be advisable to provide more relief." Senator Kuchel tried to get the Senate to kill the current $5 million annual expenditure ceiling on federal air pollution efforts, but the upper house continued it.

● **CAPITAL NOTES** . . . Interior Department's Office of Saline Water says there is a "real need" for home salt water conversion units no bigger than an automatic washer which will sell for less than $500 . . . The Russians are reported by reliable sources to have developed a pneumatic computer of the type envisioned by the Army Diamond Ordnance Fuze Laboratory's "pure fluid amplification" technique.

HIGH-REDUCTION BEVEL GEARS

To the nine gear types* already made by us for a long list of leading manufacturers, we now add High-Reduction Bevel Gears to meet a growing demand for the economy and speed reduction accomplished by this type of power transmission.

These DOUBLE DIAMOND High-Reduction Bevel Gears will supply speed reduction normally considered impractical in a single gear set of this type. In many cases they will replace more complex and more costly gear systems, thus improving design and achieving simplicity, while considerably lowering costs.

One of our gear engineers would be more than pleased to meet with you to discuss fully the interesting possibilities of this new member of the DOUBLE DIAMOND family.

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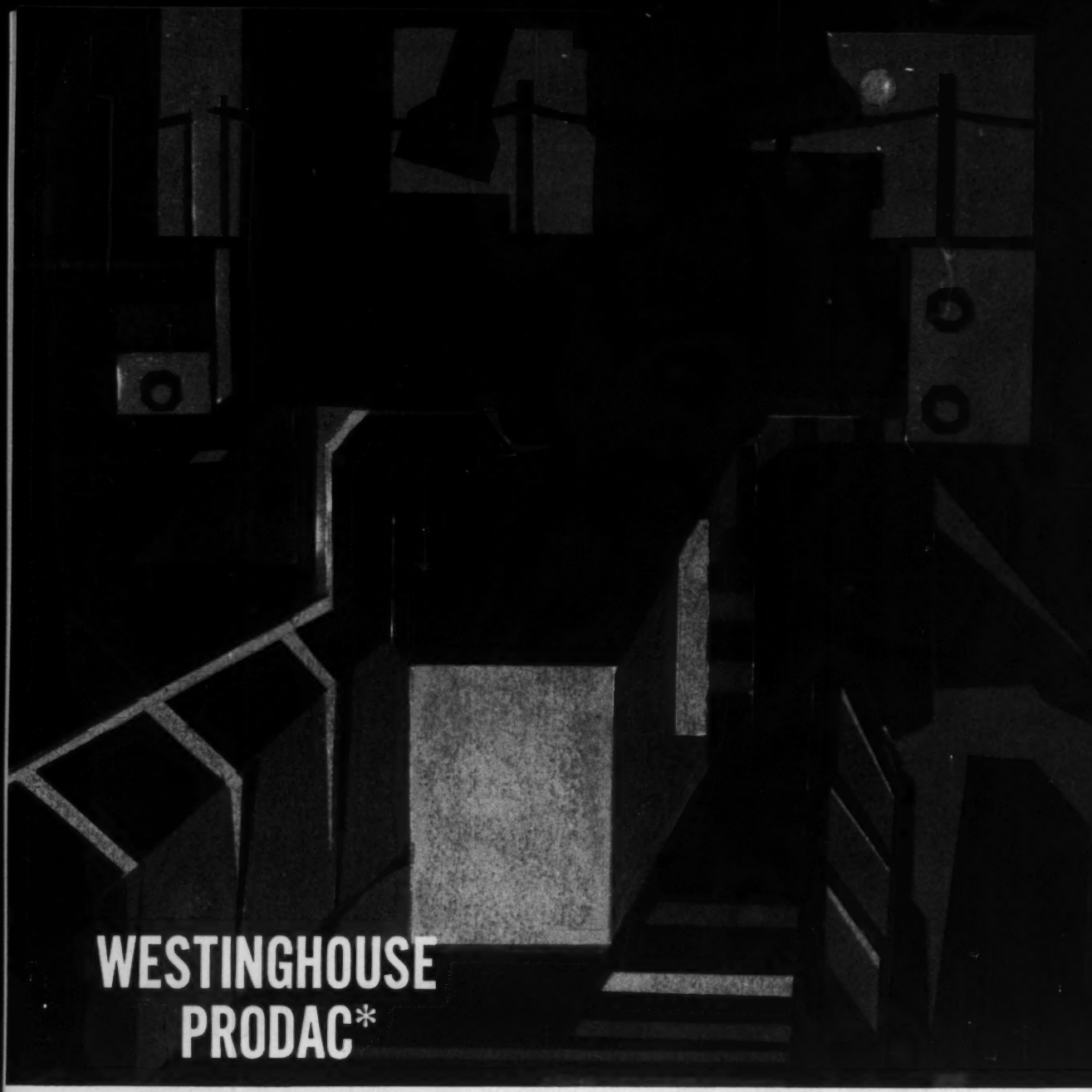
†REG. U.S. PAT. OFF.



WESTINGHOUSE PRODAC*

means automatic cycling of blooming mills

. . . completely coordinated positioning of horizontal rolls and manipulators . . . automatic operation of the fingers . . . properly sequenced operation of the tables and feed rolls . . . precisely controlled timing of the start, stop, reverse and run of the main drive. This is but one of the many ways Westinghouse PRODAC† is helping bring about "the mill of the future" today through completely automatic cycling of blooming mills.

Westinghouse has service-proven PRODAC installations that economically automate slabbing mills, ingot buggy operations, reversing roughers, stock house materials handling and many other mill applications.

By specifying Westinghouse PRODAC for your mill, you open the door to many new cost-saving benefits which are unobtainable with conventional controls. For example, PRODAC assures the most consistent standards of quality control at the highest rates of production speed . . . coordinates operation of all machines at the over-all maximum efficiency . . . holds maintenance to a minimum and practically eliminates control failures . . . gives you a "building block" design which provides flexibility required for further mill automation.

The entire team of Westinghouse PRODAC engineers is at your service to help you determine exactly where and how PRODAC can benefit you. Your Westinghouse sales engineer can give you complete information, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-22112

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*PROGRAMMED DIGITAL AUTOMATIC CONTROL

TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

Why U. S. Firms Like Belgium

- **Low corporate taxes. Maximum corporate profits tax of 45 per cent. Convention with U. S. to eliminate double taxation.**
- **Record of monetary stability. Currency readily convertible to dollars.**
- **Centrally located in European market place.**
- **Availability of good manufacturing sites. Special incentives offered by local authorities.**
- **Serviced by highly developed rail, highway, waterway, and aircraft systems. Antwerp is one of the three largest European ports.**
- **Skilled, highly productive labor force with history of labor-management harmony.**
- **High standard of living with good social and wage conditions.**
- **Thirty-five commercial treaties with other countries open new European, Asian, African, and Latin American markets to Belgian produced goods.**
- **Common Market (170 million people) and Benelux Union (21 million people) open to goods from Belgium with minimum or no trade barriers.**

FOR MANY YEARS, Belgium has been one of the first countries considered by U. S. firms wishing to establish a business base in Europe. Well over 300 U. S. business enterprises, with investments estimated at about $250 million, are now operating out of Belgium.

Some have manufacturing or licensing agreements with Belgian firms; others maintain branch offices or manufacturing subsidiaries; and others have joint ownership setups with Belgian companies.

• **Boosts Free Trade**—Traditionally, Belgian economic policy is based on free enterprise, free trade, and international economic co-operation. Since Belgium must export 40 per cent of her industrial output, the need for foreign markets is evident. Belgium has the world's highest foreign commerce per capita: $698 in 1958 compared with $175 in the U. S.

Belgium lies in the heart of Europe's most heavily industrialized and most densely populated region. Over 120 million people live within a 250 mile radius of Brussels and 21 million consumers reside in the Benelux Union (Belgium, Netherlands, Luxembourg) which has no customs barriers. The European Economic Community is headquartered in Brussels, and when the trade barriers within the Common Market are completely eliminated, Belgium will offer an even greater opportunity for those wishing to crack the West European market.

In addition, five new laws were enacted late last year to encourage industrial expansion. They provide for ample industrial credits, substantially reduced interest rates, state guarantees, and other incentives which avoid government intervention. One measure, for instance, provides that 30 per cent of the value of complementary investments may be deducted from corporate profits for tax purposes if the investments are made before Dec. 31, 1961.

• **Why Belgium?**—Some of the reasons given by businessmen for selecting Belgium as a base for European operations are listed in the exhibit, left. Most who make the move are satisfied. Bell Telephone Mfg. Co., a manufacturing associate of International Telephone & Telegraph Corp. in Antwerp reports: "For the thirty years we have been established in Belgium, our plant has never had difficulties in recruiting the skilled labor and technicians we require in ever increasing numbers."

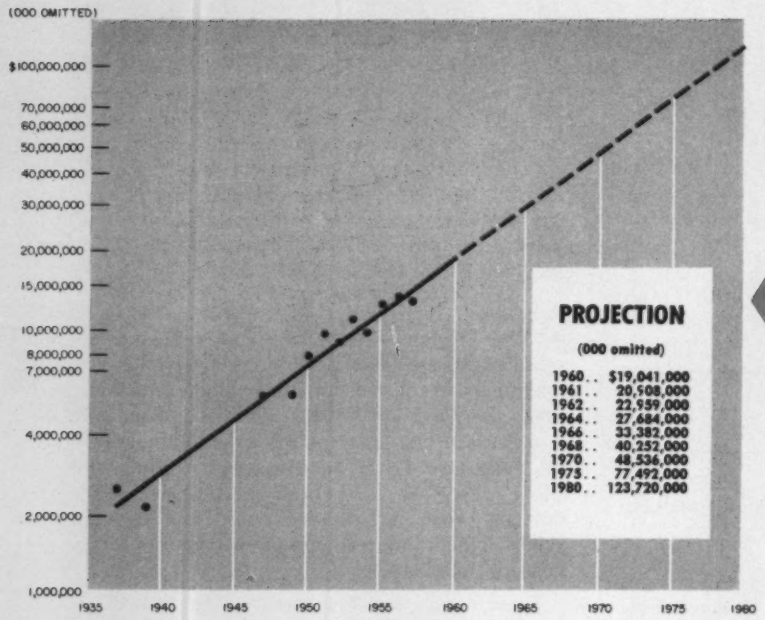
Jones & Lamson Machine Co., Springfield, Vt., recently acquired a substantial interest in LeProgres Industriel, a Belgian machine tool builder. Comments H. H. Whitemore, executive vice president: "The new arrangement will place us in a position to reinforce our place in the export markets which are threatened by increased foreign competition." Black & Decker Mfg. Co., Towson, Md., maker of electric tools, formed a Belgian warehouse, sales, and service company "to offer improved distribution and product service facilities to its customers throughout the Belgium-Luxembourg area," relates Robert D. Black, president and chairman. Adds Mr. Black: "The hardness of the Belgian franc makes this a feasible operation."

Electronic Associates Inc., Long Branch, N. J., set up an analog computer center in Brussels in 1957 because "Brussels is the hub of a transportation network connecting all of Europe and is a flourishing research and development center," states C. L. Adamson, vice president.

"Belgians work well for U. S. companies," comments J. D. Hinck, director of Minneapolis-Honeywell Regulator Co.'s Belgian subsidiary. "Complete currency convertibility" pleases George T. Asp, administrative director, Nowland & Co. Inc., a market and product planning research organization which established a Belgian affiliate three years ago.

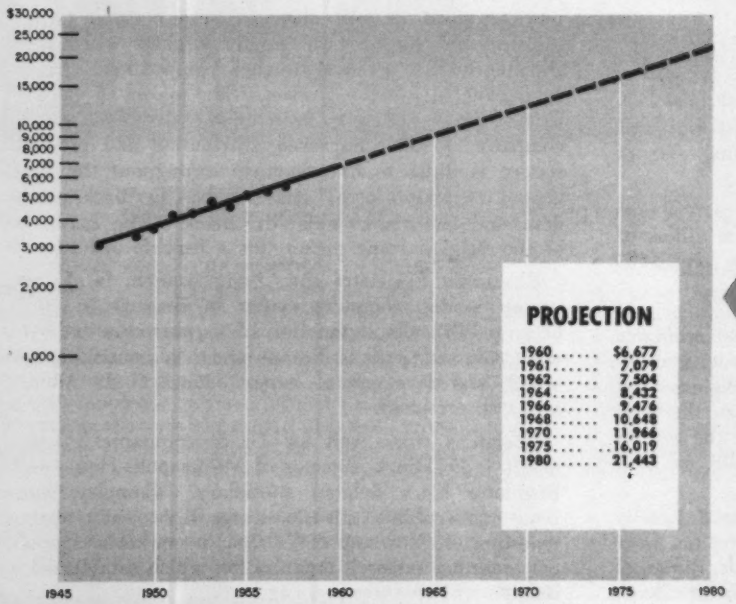
PROJECT 1980

Primary Metals to Gain Over Next Two Decades



Value Added by Manufacture to Reach $123.7 Billion by 1980

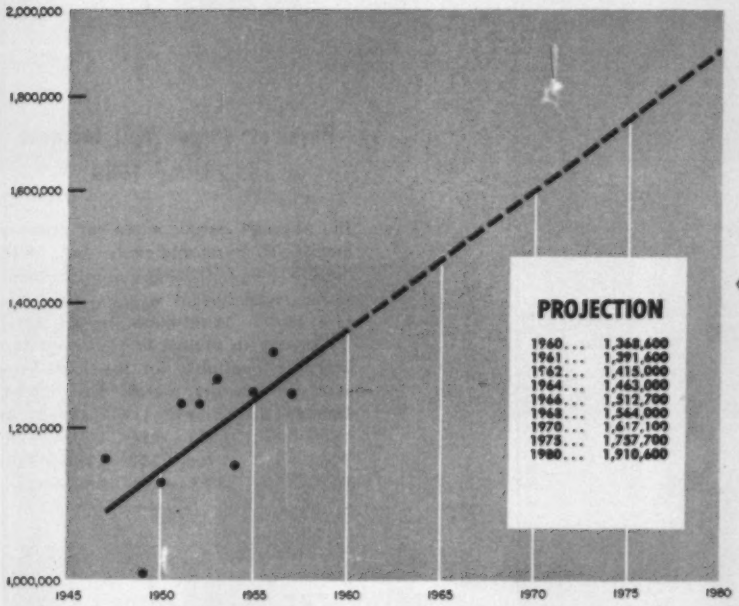
This chart shows the value added for each census year from 1937 through 1957. The dots in this and succeeding charts indicate the actual figure for each survey year. The line is the trend. Dots are missing for World War II years in some of the charts because surveys were discontinued then for security reasons. Dollar figures in this and other graphs are unadjusted, and the projections include estimates for inflation.



All Employees' Average Annual Earnings Will More Than Triple

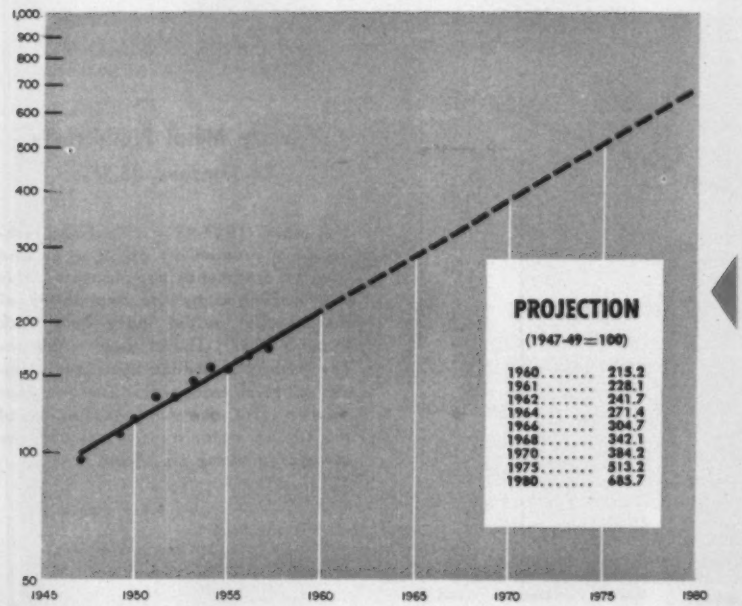
This chart is derived from corresponding census data for total wage and salary compensation and the total number of employees. Economic productivity, or the yearly ratio of value added by manufacture (above) to total earnings in primary metals, has been nearly constant at the $1.85 average for 1947 through 1957. This illustrates the Rucker Share of Production Principle, and it shows that the employee's share of production for primary metals, taken as a whole, is 54.05 per cent of the values created and that the company's share averages 45.95 per cent.

Value added by manufacture will be more than six times greater in 1980 than it is this year. Prices may more than triple. Productivity should improve by one-third. Those are some of the probabilities projected for Standard Industrial Classification Group 33 (primary metals) by Eddy-Rucker-Nickels Co., Cambridge 38, Mass., a management consulting firm. This is the third of six metalworking growth studies prepared for STEEL.



Employment Will Jump 39.6% Within 20 Years

This charts both hourly and salaried employees for each census year from 1947 through 1957. Government figures are not available in earlier years for the entire primary metals industry. Although data extend back for only ten years, the trend for the decade is fairly stable, and a projection for 20 years is believed warranted. Experience shows that established growth trends change slowly, if at all. But actual conditions in any future year may fluctuate above or below the trend. So all six of these projections represent probabilities, not precise predictions.



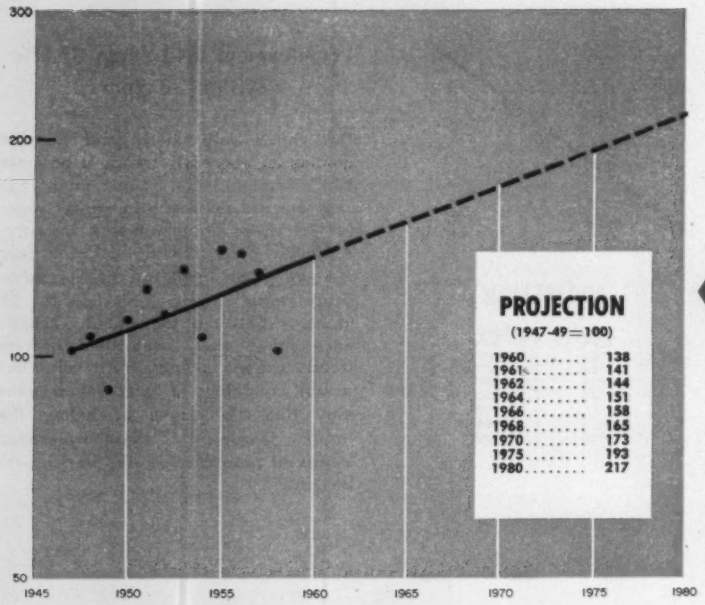
Primary Metal Prices May More Than Triple

This is a synthetic price index. No wholesale product price analysis for primary metals is available from U. S. sources. It's derived this way: Set up an index for value added by manufacture, using 1947-49 as the base of 100. Then divide that by the corresponding Federal Reserve Board index of industrial production for primary metals. Steel represents 75.1 per cent of the entire primary metals group. The profile for steel only can be traced back to 1929. Its projections (1947-49 = 100) look like this: 1960—162.8; 1961—169 6; 1962—176 7; 1964—191 8; 1966—208 2; 1968—226.0; 1970—245.3; 1975—301.1; 1980—369.6.

(*Please turn to Page* 58)

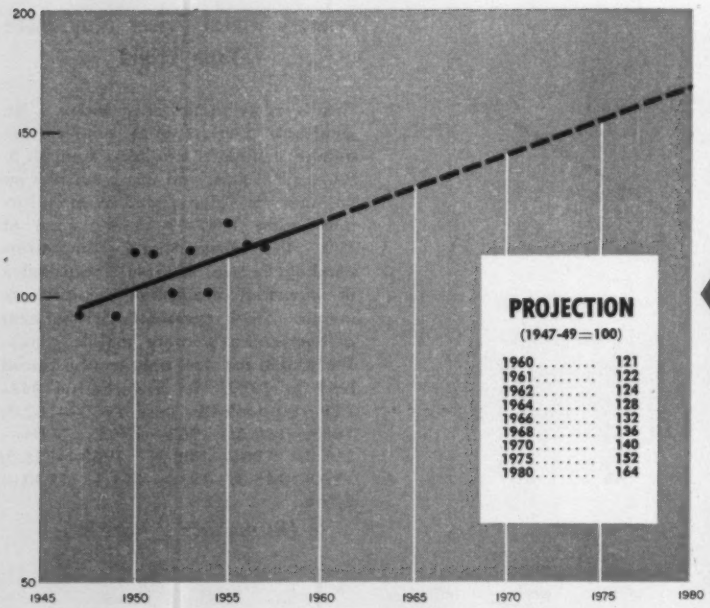
PROJECT 1980

• An extra copy of this or the first two articles in the series (STEEL, June 13, p. 122, and June 27, p. 54) is available. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. By using material like this, you may win $1000. For details, see Pages 5 and 6. The next study in STEEL's "Project 1980" will appear July 25.



Physical Output Will Increase 57.2% by 1980

The physical output index for primary metals is available only for 1947 through 1957. The grouping of nonferrous with ferrous was not used before 1947. With these limited data, it's chancy to project to 1980, but figures are available for the steel segment of primary metals from 1929. Steel's projections (1947-49=100): 1960—176; 1961—186; 1962—196; 1964—218; 1966—242; 1968—268; 1970—298; 1975—387; 1980—503.



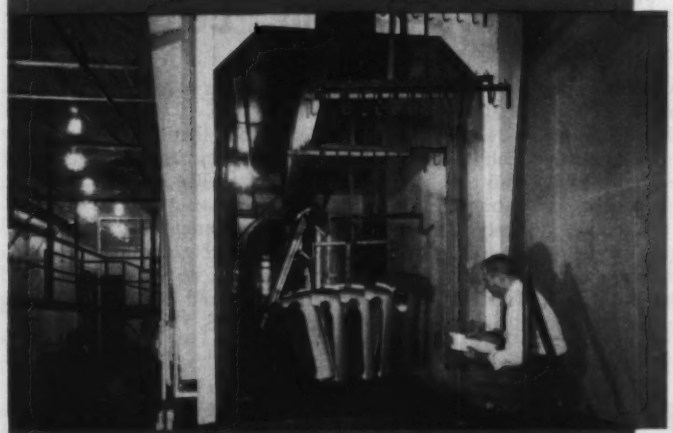
Primary Metal Productivity To Improve 35.5%

This index (1947-49=100) shows technological productivity of all wage and salaried employees per manyear. This is also limited by the availability of the physical output index only back through 1947. The physical output index (above) is divided by a special index of total manyears. The manyear figures were derived from Bureau of the Census data, as are many of the statistics in these six charts.

Herding more body parts down the finish line

Control Center for 2 Despatch flow coat machines and air circulating systems.

WASHED-TREATED Seven stages of ultra-efficient processing are provided by this sheet metal parts washer rustproofing machine, on auto makers body part assembly line.



FLOW COATED Parts enter one of the Despatch flow coat machines controlled from the panelboard shown in top illustration. Drip area for this 40 ft. machine is 560 ft. long.

Modernization Speeds Production on 1960 Automobile Finishes with DESPATCH SYSTEM

Smoother, long lasting finishes are achieved with reduced labor costs in this recent Despatch installation. This up-to-date finishing system, manufactured and installed for a leading automobile producer, provides . . . better rustproofing . . . smoother more evenly coated application of paint or primer . . . more economical use of finishing materials . . . and reduces direct labor costs by introducing new efficiency and eliminating hand prefinishing operations.

Rarely are two finishing problems identical . . . yours may differ considerably from those faced by this major auto producer. A Despatch analysis of your finishing system can determine what system is best for your product. Despatch experience has been solving the finishing problems of industry since 1902. It will pay you to take advantage of a Despatch finishing analysis in your plant. Write today for new bulletin on Despatch engineered systems for modern finishing of metals.

DESPATCH

DESPATCH OVEN COMPANY
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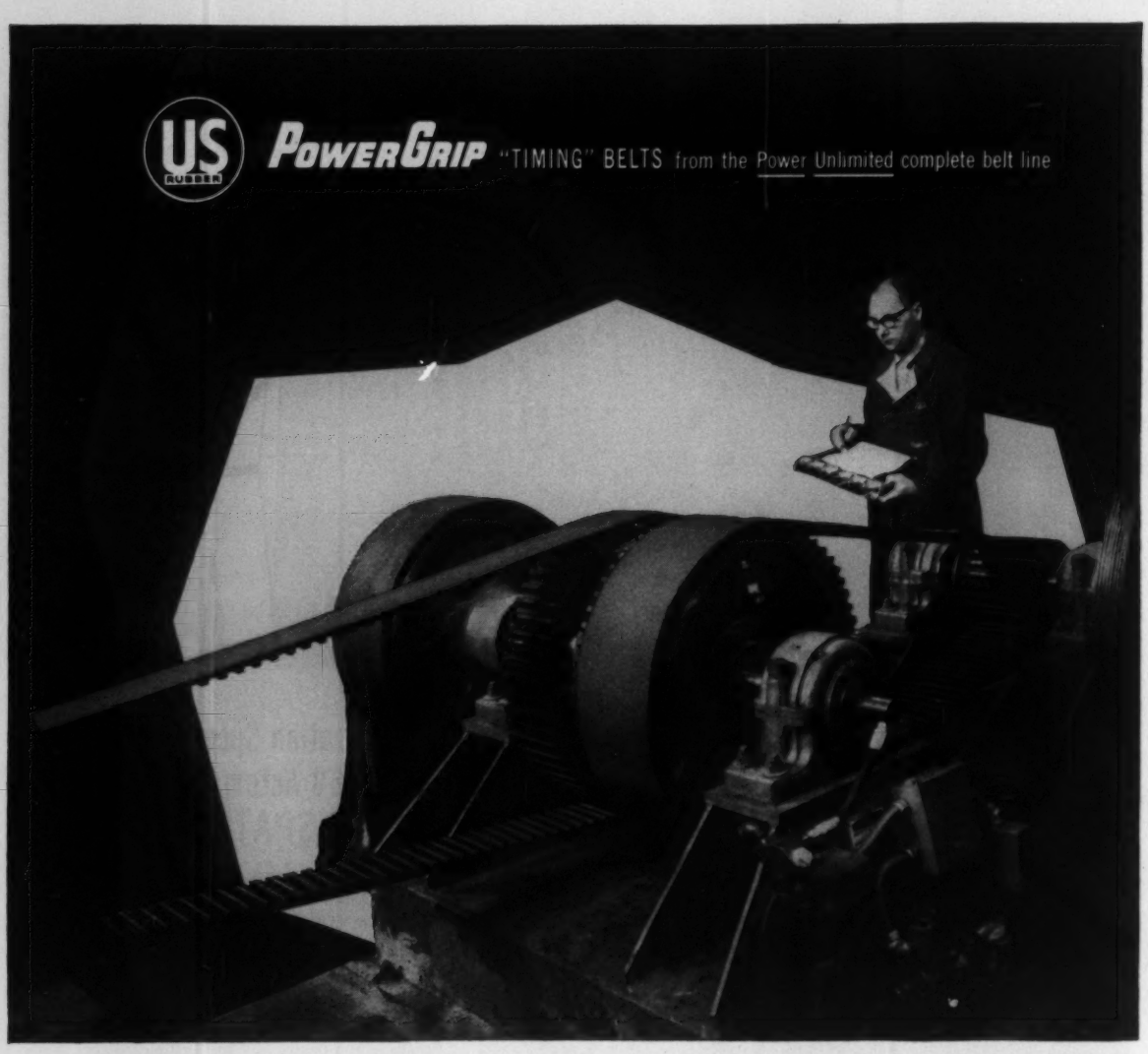

Sun Oil Company obtains positive results with U.S. PowerGrip "Timing" Belts

The octane requirements for cars are determined by the Sun Oil Company with scientific accuracy. The octane ratings of motor fuels are in turn determined with precision. Nothing is left to chance. This is why the motorist can pull up at a Sunoco station and obtain the correct octane blend for his car.

All of this predetermination is done on precision equipment whose universal joint drive shaft is connected to a dynamometer by a 1¼" pitch U. S. Rubber PowerGrip "Timing"® Belt. In the words of a company scientist, these belts were selected because they give foolproof, positive drive transmission and do not require lubrication, maintenance or attention. Anything less would interfere with the precision of the testing equipment. This is the experience that has caused innumerable design engineers to specify PowerGrip.

This is the belt that has made possible the development and production of hundreds of appliances and equipment, ranging from sensitive electronic devices, office machinery, household equipment and gigantic production machinery. One way to get expert and instant power and transmission advice is from the U. S. Distributor.

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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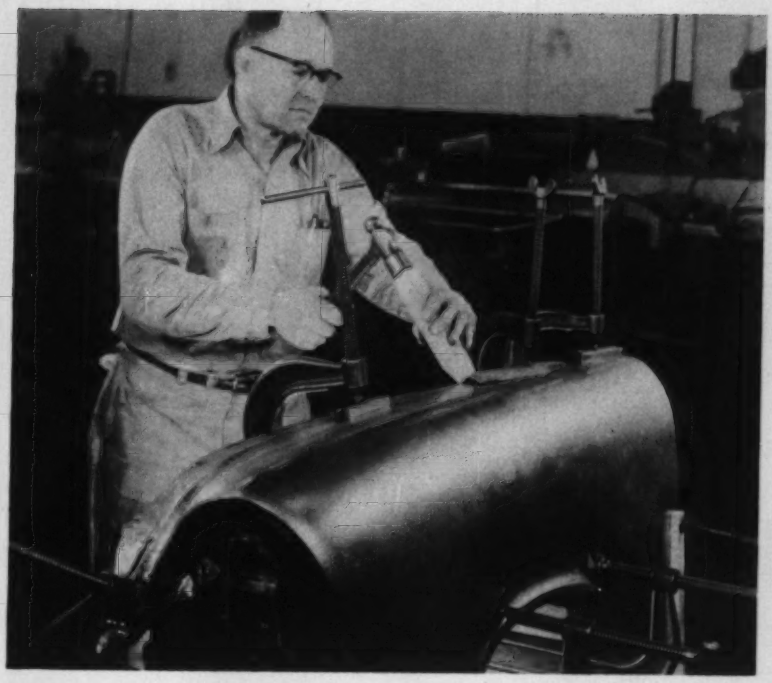

Tooling Releases for '62s Disappointing to Die Shops

AUTOMOTIVE tooling programs for 1962 models call for few changes. This doesn't make for happiness among the more than 250 tool and die shops that service the industry. They're even more concerned because it looks like the programs will be later—and smaller than originally anticipated.

First, '62 releases from Ford Motor Co. and Chrysler Corp. went out to pattern shops late last fall following traditional timing. Although GM does most of its body tooling through Fisher Body Div., its '62 programs call for only minor changes.

• **Cancellations**—Early this spring most of the Ford and Chrysler programs were pulled back within hours of each other. Industry sources claim one reason was that the two companies discovered their '62 styling was too similar. Chrysler followed this with a sizable layoff of body engineers and draftsmen. A second personnel cutback came six weeks ago. A third reportedly is scheduled after the model changeover which started July 1.

Pattern shops now report the Ford and Chrysler programs have been re-released. But they're considerably altered. Chrysler apparently still is redoing its "A" body which will be shared by Plymouth and Dart, but the "B" body shell will be little changed. The big Mercury body reportedly has been scrapped. Other Ford jobs that have been returned to the shops indicate some fairly extensive restyling on the compacts.

• **Less Work**—But the volume of work available still isn't large. No tooling is reported in the Detroit area for Ford's new small car, variously called Cardinal, Hummingbird, and Segment III. This seems to substantiate earlier reports that this job is being tooled in Germany.

More of the work, however, is going into captive shops. Chrysler used to buy 90 per cent or more of its tools and die work outside. Now that it's built up facilities in its Twinsburg, Ohio, plant, Detroit shops claim they're getting a chance to bid only 65 per cent or less of the 1962 program. Ford is adding more tryout presses to its tooling facilities. The word is that a good share of the '62 work that Ford pulled back now will be done in its own plants. Several sources have told STEEL that GM's Fisher Body Div. may place some of its '62 model work outside to make room for a major 1963 program. There also are supposed to be at least two new engines and another transmission in GM's '63 programs.

• **Close Shops** — Meanwhile, tool and die makers virtually have finished 1961 tooling. Layoffs are climbing rapidly. Automotive tooling normally is slow now. A few shops said they've been promised work by September, but it looks like the bulk of the releases won't come until late in the year.

U. S. Auto Output

Passenger Only

	1960	1959
January	688 731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	610,000†	557,995
6 Mo. Totals	3,806,431†	3,284,012
July		555,410
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
June 4	115,068	125,186
June 11	139,423	127,029
June 18	137,641	129,270
June 25	141,247	127,217
July 2	127,511†	108,397
July 9	95,000*	123,147

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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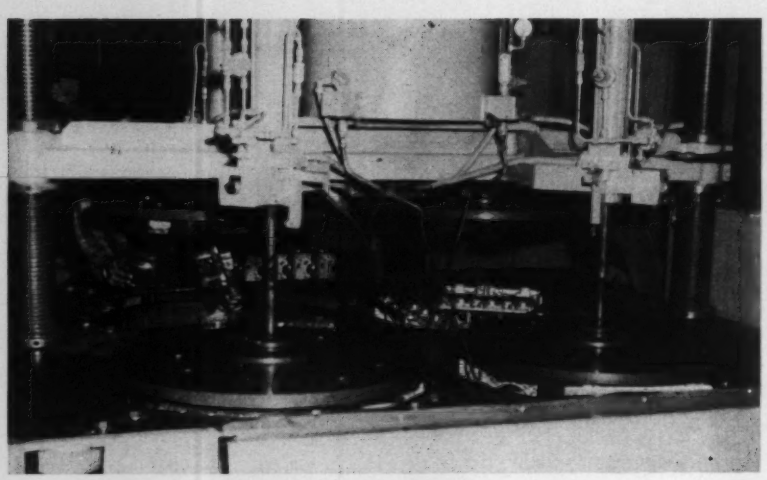
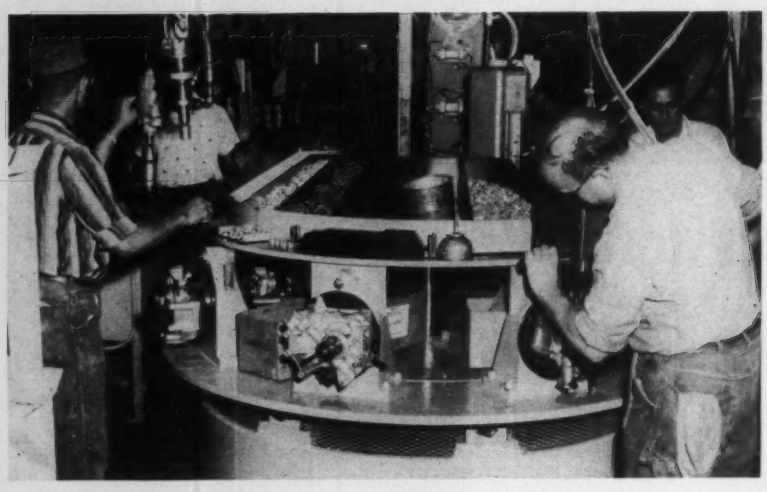
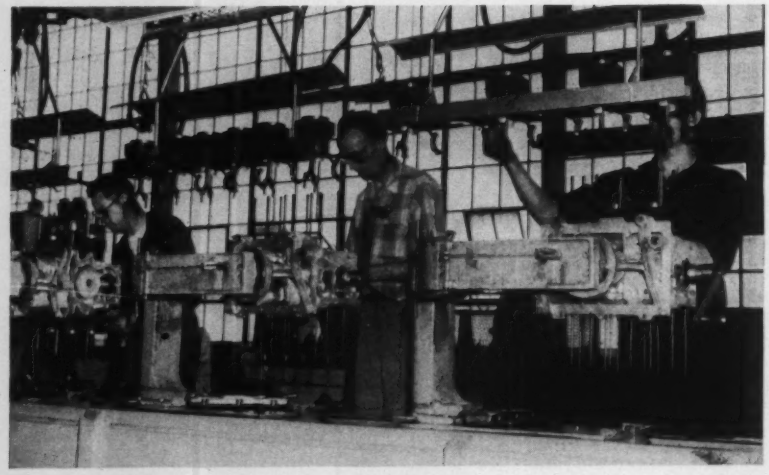


Crankcase halves are lapped in this rotary machine



Rear engine housing subassemblies are built up on "lazy susans"



Saddle fixtures hold crankcase halves for assembly

Corvair Assembly Line Features Unique Fixtures

ALUMINUM ENGINES for Corvairs are machined and assembled at Chevrolet's Tonawanda, N. Y., engine plant. Although the line is fairly conventional for aluminum processing, it features some unusual equipment aimed at simplifying machining and assembly operations.

- A central coolant system contained in two, 600,000 gallon tanks supplies lubricants for cutting tools and chip removal on all machines. It has its own filtering system and can pump up to 4000 gpm.
- Mating surfaces of crankcase halves are lapped with 400 grit abrasive in a mineral oil base. Four rotating discs come down and revolve over four circular fixtures. Each fixture holds three parts under a lapping wheel.
- Engine subassemblies are built up on rotating "lazy susan" tables. All parts and fasteners are stored in easy-to-reach bins.
- Universal saddle type fixtures, located on 4 ft centers, are used on the 600 ft engine assembly line. A crankcase half is bolted onto each fixture which can be turned 360 degrees in all planes for easy access.

About 15 different light metal parts are shipped 200 miles from the division's aluminum foundry at Massena, N. Y. The Tonawanda foundry casts gray iron cylinder barrels and exhaust manifolds. The forge shop makes crankshafts and connecting rod caps.

More than 350 machines are used for production finishing. Rated line speed is 70 engines an hour. Reject rates now average 4 per cent for all operations, claim plant engineers. Only lift and carry transfer mechanisms are used because roller conveyors cause parts wear. Cylinder bores and crankcase faces are critical finish areas. Bores are held to plus or minus 0.002 in. Faces are milled across on one machine, then transferred and milled back on a second to avoid reversing cuts.

Completed 280 and 320 lb engines move by overhead conveyor to a hot test area where they're hooked up and run on natural gas which gives more complete combustion.

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...

Raw Materials?

Your final decision to expand or build results from a series of important individual decisions. Raw material availability is one of them. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. In addition, KE designs and builds for the Steel industry... offers skilled experience in all types of facilities from raw material plants to finishing mills. Whatever your requirements... from Pre-Engineering analyses through plant design and construction... Kaiser Engineers brings world-wide experience and ingenuity to their solution.

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Oakland 12, Calif. — Chicago, New York, Pittsburgh, Washington, D.C.
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6231-8

Now . . . Look to Lukens For Steel Shape Savings

Face up to the true cost of inventories

$253.50 *in interest alone.* That's what it would have cost our customer to stock the steel for his order of these 5-16" gage tube sheets—had he decided to blank and punch these shapes in his own plant. His plate stock cost would have been $25,350. The interest cost of carrying this for 90 days at—say 4%—is $253.50.

Fortunately, the customer took advantage of Lukens Steel Plate Shapes Service and avoided tying up his capital in plate inventory. *Plus:* he paid no freight charge on the 50% scrap involved . . . instead he was given an allowance for the scrap at high steel mill prices. He avoided the expense of scrap handling. He eliminated the problem of shop spoilage.

Moral: Don't tie up capital in steel plate inventories. Contact Lukens for Steel Plate Shapes Service . . . flame cutting, shearing, blanking, pressing, bending, welding—of carbon and alloy plate produced on our own rolling mills. Call or write Fabrication Building, Lukens Steel Company, Coatesville, Pennsylvania. Address Dept **B-70.**

LUKENS STEEL COMPANY
Fabrication Building, Dept. B-70
Coatesville, Pa.

Please send me your free booklet on Steel Plate Shapes.

Name_____

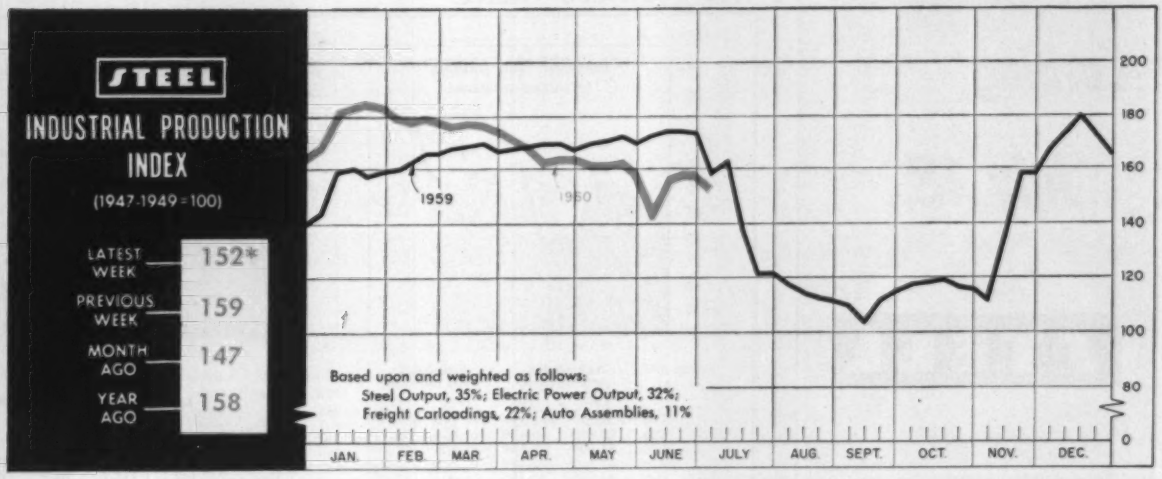
Company_____ Title_____

Address_____

City_____ Zone_____ State_____

150 YEARS OF STEEL IN STEP WITH SCIENCE

LUKENS



*Week ended July 2.

Consumer Buying Attitudes Soften

CONSUMERS have the means—continually rising income—to push the economy to new highs in the second half of 1960, but the big question seems to be: Will they do it? Some doubt is cast on the answer by the latest results of the highly regarded survey of consumer expectations conducted by the University of Michigan Research Center.

While the report, based on 1400 interviews in May, indicates that the consumer is still in a spending mood, it reveals that doubts and uneasiness have become pronounced since the February survey. No particular bad news is causing this turn of sentiment, but the center feels the lack of good news is a key element. "In February, 1960, the index of attitudes reached a high point primarily because of a favorable evaluation of the automobile market. . . . But at present, many people do not see any new developments which would serve to stimulate the economy further," the center asserts.

• **Other Side of Coin**—But that doesn't mean consumers are pessimistic. In fact, most feel that we are in good times and that the situation will continue for another year. Three out of five persons interviewed feel that conditions a year from now will be about as they are today. One-third think business conditions today are better than they were a year ago, while 42 per cent see no change. The remainder feel conditions are worse.

They are less fearful of inflation than in the past. "Should this trend continue and should the upward movement of incomes be maintained, a stimulation of consumer demand is to be expected," the center feels.

• **Buying Intentions**—In at least three major areas, consumers show a strong willingness to maintain high level purchases. The new car market for the 1960 model run

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,218[1]	1,510	2,252
Electric Power Distributed (million kw-hr)	13,350[1]	14,213	13,127
Bituminous Coal Output (1000 tons)	9,020[1]	8,895	8,758
Crude Oil Production (daily avg—1000 bbl)	6,800[1]	6,820	6,914
Construction Volume (*ENR*—millions)	$686.4	$485.1	$476.3
Auto, Truck Output, U. S., Canada (*Ward's*)	157,423[1]	177,129	139,829
TRADE			
Freight Carloadings (1000 Cars)	480[1]	642	573
Intercity Truck Tonnage (changes from year ago)	−6 6%	−5.8%	+12.2%
Business Failures (Dun & Bradstreet)	296	353	256
Currency in Circulation (millions)[3]	$31,867	$31,927	$31,852
Dept. Store Sales (changes from year ago)[3]	+6%	+3%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,079	$30,513	$26,018
Federal Gross Debt (billions)	$286.1	$288.9	$284.4
Bond Volume, NYSE (millions)	$24.9	$27.6	$23.4
Stocks Sales, NYSE (thousands of shares)	14,820	18,280	12,957
Loans and Investments (billions)[4]	$103.8	$104.2	$102.4
U. S. Govt. Obligations Held (billions)[4]	$25.6	$25.8	$30.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	232.4	231.9	221.4
All Commodities[7]	119.4	119.5	119.3
Commodities Other than Farm & Foods[7]	128.3	128 3	127.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

Coming

July 18

IN

STEEL

How To Buy Creatively

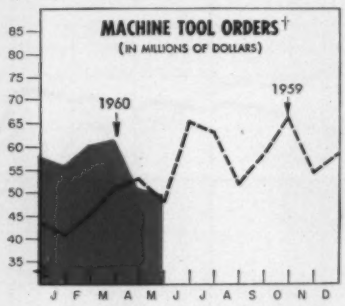
The second in STEEL's 13-part series on Materials Efficiency appears next week. It's part of the 1960 Program for Management, designed to show you how to attain higher efficiency to counteract growing foreign competition and rising wages and other costs.

The creative purchasing agent is replacing the old-style buyer. There are many routes to creative buying, but these stand out:

- Make materials work harder.
- Look at what new materials can do.
- Pick the right material.
- Use suppliers' brainpower.
- Get higher reliability.
- Standardize for lower costs.
- Use teamwork to trim costs.
- Slash scrap costs.
- Get more for less.
- Make your buyer a professional.

Check STEEL next week when all ten of those approaches will be analyzed.

THE BUSINESS TREND



	New Orders (000 omitted)		Shipments (000 omitted)	
	1960	1959	1960	1959
Jan.	$56,450	$41,050	$46,400	$31,300
Feb.	60,600	45,400	51,950	36,050
Mar.	61,950	51,550	64,500	45,750
Apr.	51,850	53,200	55,100	45,000
May	49,800*	48,700	54,500*	41,000
June	.....	65,400	.....	50,050
July	.....	63,400	.....	40,600
Aug.	.....	52,200	.....	40,300
Sept.	.....	58,850	.....	46,150
Oct.	.....	66,650	.....	51,500
Nov.	.....	54,250	.....	46,600
Dec.	.....	58,300	.....	63,850
Totals	.....	$658,950	.....	$538,150

†Metal cutting and metal forming.
*Preliminary.
National Machine Tool Builders' Assn.
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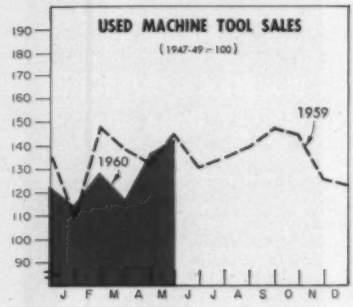


	1960	1959	1958	1957
Jan.	115.0	109.5	121.1	n.a.
Feb.	129.3	148.1	121.9	n.a.
Mar.	117.8	139.3	106.3	n.a.
Apr.	137.5	132.9	105.0	152.1
May	143.2	145.7	99.5	132.6
June	....	131.3	111.9	137.0
July	....	135.3	115.0	125.3
Aug.	....	139.7	93.4	115.6
Sept.	....	147.8	113.6	117.0
Oct.	....	145.2	128.8	108.9
Nov.	....	126.8	122.3	104.5
Dec.	....	123.1	135.2	87.7
Avg	....	135.4	114.5	128.9

n.a.=not available.
Machinery Dealers National Assn.

looks good, with special emphasis on the compact cars. However, the demand for compacts seems to be coming, at least partly, at the expense of used cars.

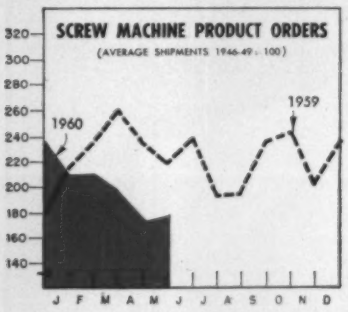
Buying intentions for several major household appliances, such as refrigerators and washing machines, are somewhat more frequent in the current report than they were in May, 1959. However, TV sets have lost ground.

Plans to make improvements, additions, and large repairs to homes are as numerous as they have been since the best level reported in 1956. (This is corroborated somewhat by the report from the Gas Appliance Manufacturers Association that stepped-up home improvement activity was reflected in May shipments of gas conversion burners and direct heating equipment.) On the other hand, plans to buy a new or used home declined from May, 1959, to May, 1960.

• **Incomes Climbing** — The report gives every reason to expect personal income to continue its uptrend. Not only are most people making as much as or more than they did a year ago, but they expect to be better off by this time next year. Those attitudes have remained relatively unchanged over the last year. While there has been a slight decline in the number of persons reporting they are or expect to be better off, there has also been a dip in the number reporting worse off.

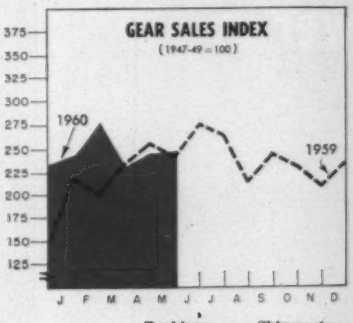
• **Index Declines**—Despite the outward signs of prosperity and optimism, the Survey Research Center's index of consumer attitudes and inclinations to buy has deteriorated since the previous survey in February. Reason: Plans and outlook were not quite as good as in February. Result: The index dropped to the lowest point since the May-June survey in recession 1958. The center feels that is important when related to total durable goods sales. There has been a marked correlation between the two in the last several years. If the relationship continues, it follows that a decline in durable goods business is getting underway.

The decline in confidence is not attributable to any major event, the center declares. There was some thought that the collapse of the summit conference might have been partly to blame, but replies to the survey questions before and after the collapse showed no change in



	New Orders		Shipments	
	1960	1959	1960	1959
Jan.	209	215	220	193
Feb.	207	236	219	193
Mar.	198	260	241	214
Apr.	174	234	205	219
May	179	219	195	201
June	...	239	...	218
July	...	192	...	194
Aug.	...	194	...	205
Sept.	...	236	...	217
Oct.	...	243	...	243
Nov.	...	201	...	208
Dec.	...	237	...	225
Avg	...	226	...	211

*Preliminary.
National Screw Machine Products Assn.



	Bookings		Shipments	
	1960	1959	1960	1959
Jan.	243.4	218.6	207.3	187.7
Feb.	278.6	199.9	230.2	201.5
Mar.	231.8	234.3	244.6	222.7
Apr.	249.2	255.6	234.8	231.8
May	246.9	241.0	241.3	223.9
June	....	274.2	....	239.7
July	....	262.8	....	199.8
Aug.	....	213.3	....	204.3
Sept.	....	213.9	....	216.1
Oct.	....	230.5	....	224.1
Nov.	....	209.7	....	224.2
Dec.	....	233.9	....	250.2
Avg	....	234.7	....	218.8

American Gear Mfrs. Assn.

pattern. The center also reports that a marked lack of knowledge about the stock market decline (only 15 per cent of the respondents could describe more or less correctly what has happened to the market in the last few months) ruled out that development.

● **Recession Prone**—More likely a cause of the decline in optimism is the fact that people are becoming recession conscious. They do not think that the nation is in danger of a 1930 type depression, but they are already expecting a recession similar to that in 1958 and 1953-54. "In most income groups, three times as many people think that a recession is likely to happen again than think that it is not likely to happen again," the report states. Sixteen per cent of all the respondents think it is underway or will start soon. Some feel it will be in 1961, while many more feel it will be in the following two or three years.

"Since people in general believe that a recession will come sooner or later, they look for its signs. At present, few see such signs, but, on the other hand, they likewise miss seeing signs of a further upturn. Absence of stimulating factors makes for uneasiness," the research center concludes.

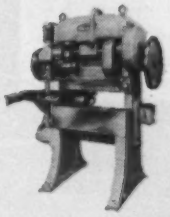
Building Outlook Brighter

Early doubt about the vitality of the construction industry in 1960 is being laid to rest as contracts for future construction burgeon with the spring. Last month was the best June on record, declares *Engineering News-Record*. The $2.9 billion total for the month brought the first half figure for heavy construction contracts to $11.4 billion, within a fraction of the record first half of 1956.

The news comes just when work put in place figures might otherwise dampen the outlook. The Commerce Department reports that construction activity in June was at an annual rate of $53.4 billion compared with $53.9 billion in May. The most encouraging part of this report is the slight upturn noted for residential buildings. June's annual rate of $21.1 billion was $60 million higher than May's.

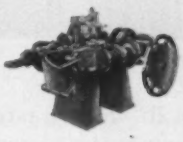
The rise in contract awards noted throughout the spring should be felt in work put in place before the second half is over. There is still a possibility that construction activity in 1960 will match or surpass the 1959 record of $54.3 billion.

the special meaning of **BAIRD**



A hundred and fourteen years is a long time, but that's exactly how long Baird has been in the business of building high production machinery for turning out pistons and paper clips... light bulb sockets and safety pins. We've built chuckers for the automotive and appliance folks, four-slide units and transfer presses for the wire and ribbon forming people, bench presses, vertical lathes, and tumbling barrels for thousands of big and little companies.

Since 1846 Baird machines have been designed right and built right... to perform as specified and earn their cost, many times over. Our customers have come to know this.



They have come to know, too, that the name "Baird" on their machine has a special meaning. From our sales representative's first call, right through sample work, quoting, tooling, delivery, installation and service... they can always count on Baird coming through. Making fine machinery is only part of the special meaning of Baird. We make good friends, too.

If you have a new part coming up or you are interested in cost reduction and quality improvement on current production, why not let us hear from you?

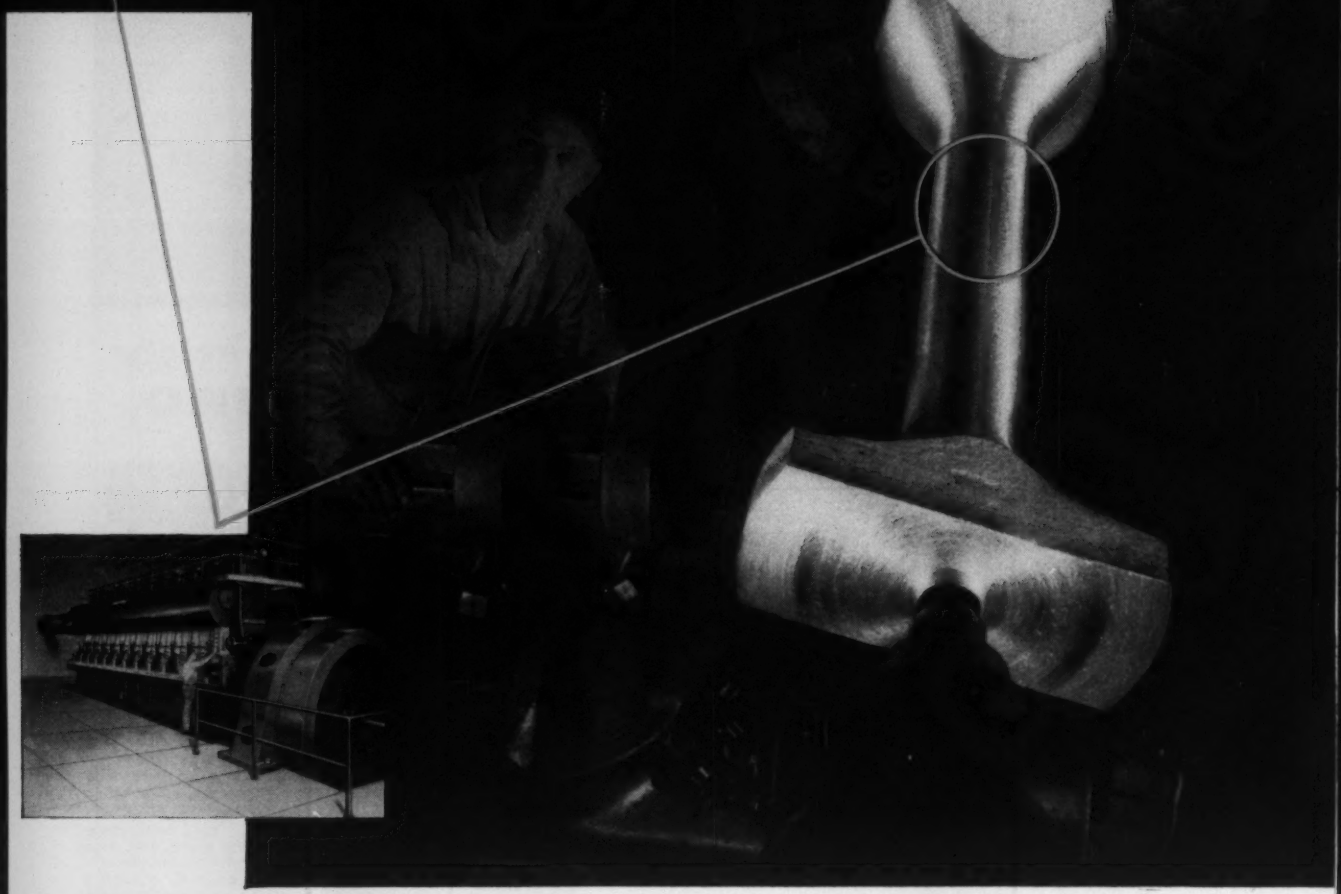
Sumwood Q. Blaisdell

BAIRD

THE BAIRD MACHINE COMPANY
1300 Stratford Avenue, Stratford, Conn.

1BM59

1500 lbs. of Forged Steel Power Transmission

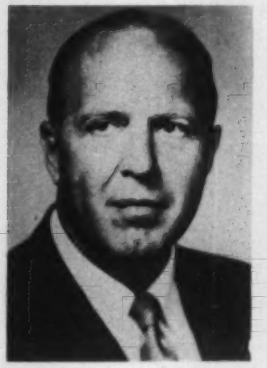


This 1500 lb. forged steel diesel engine connecting rod is taking a "dressing down". At working weight (1400 lbs.) it will transmit horse power in a municipal power plant. Another photographic example of the diverse sizes and weights of component parts going through our forge shops daily. You are assured of the same engineering and metallurgical quality control, the same careful craftsmanship which characterize steel forgings weighing 80 tons and more, when you place with us the responsibility for making any size forged steel component part.

Regardless of the size or weight of steel forgings or castings you require, it will pay you to consult with us.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA



GEORGE L. WEISSENBURGER
Vanadium Corp. president

THOMAS A. FRIBLEY
Cleveland Cap Screw pres.

ARTHUR KELLERMANN
Alemite & Instrument mfg. mgr.

GORDON W. SMITHSON
Pratt & Whitney chief eng.

George L. Weissenburger, former vice president, was elected president of **Vanadium Corp. of America**, New York. **William C. Keeley**, former president, was elected chairman, continuing as chief executive officer. **George C. Floyd** was named senior vice president.

Thomas A. Fribley was elected president, **Cleveland Cap Screw Co.**, Cleveland, subsidiary of Standard Pressed Steel Co. Former executive vice president, he succeeds his father, the late **Joseph W. Fribley**.

Francis X. Buschman was made director of research, development and engineering, **Hitemp Wires Inc.**, Westbury, N. Y. He was vice president-operations, Tensolite Insulated Wire Co.

Fuller Co., Catasauqua, Pa., subsidiary of General American Transportation Corp., appointed **C. C. Kaesemeyer** executive vice president-sales; **Donald S. Douglas** vice president-division sales co-ordination; **Jack L. Prather** assistant to the president.

John D. McPherson was elected president, **Jefferson Chemical Co.**, New York, succeeding **George R. Bryant**, retired.

Hermann K. Intemann was named director of purchases for **Union Carbide Corp.**, New York. Former president of **Union Carbide Metals Co.**, a division, since 1957, he is succeeded by **William H. Feathers. James R. Johnstone** was made president of **National Carbon Co.**, division, succeeding Mr. Feathers.

Arthur Kellermann was made manager of manufacturing, **Alemite & Instrument Div.**, Stewart-Warner Corp., Chicago. He was plant superintendent.

Graeme D. Plant was named manager of engineering, **Kaiser Steel Corp.'s** Fabricating Div. plants at Napa and Fontana, Calif. He succeeds **G. G. Greene**, retired. **John A. Shackleton** was made assistant manager to succeed Mr. Plant.

Fortune P. Ryan was elected president of **Royal McBee Corp.**, Port Chester, N. Y., to succeed the late **Philip M. Zenner**. Mr. Ryan was executive vice president.

J. Carl Ferguson was named director of electrical conductor marketing, Electrical Conductor Div., **Kaiser Aluminum & Chemical Sales Inc.**, Oakland, Calif. He is succeeded as division general sales manager by **Cornell C. Maier. R. B. McMullin** was made Los Angeles district sales manager, Industrial Div., to succeed Mr. Maier. He was product manager of extrusions.

Raymond W. Doell, vice president, **Gleason Works**, Rochester, N. Y., assumes over-all administration of engineering activities as chief engineer.

Dr. Donald A. M. Mackay was made director of research at **Evans Research & Development Corp.**, New York.

Jerome Podell was made chief engineer, **Hi-Press Air Conditioning of America Inc.**, New York.

Gordon W. Smithson was named chief engineer, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He is responsible for all engineering activities. **Guy H. Drewry** continues as manager of engineering, responsible for administrative activities. Mr. Smithson was vice president, Potter & Johnston Co., Pawtucket, R. I., which moved in 1959 to West Hartford and integrated with P&W.

Paul Enyeart was named purchasing agent, Stainless Steels Div., **Joslyn Mfg. & Supply Co.**, Chicago. He replaces **H. P. Lowe**, retired.

Michael J. Fink, chief engineer, was elected vice president, Engineering Dept., **Mechanical Specialties Co.**, Los Angeles.

Fritz Nussbaum was promoted to executive vice president in charge of operations of **Apex Smelting Co.**, Chicago.

Raytheon Co., Waltham, Mass., elected these vice presidents: **Glenn R. Lord**, general manager, Equipment Div.; **Fritz A. Gross**, assistant general manager, Equipment Div.; and **Thomas L. Phillips**, assistant general manager, Missile Systems.

Dr. Leonard C. Maier Jr. was named engineering manager, Semiconductor Products Dept., at **General Electric Co.'s** Electronics Park, Syracuse, N. Y.

Ernest R. Roth, formerly in charge of Atlantic Refining Co.'s Industrial Wastes Engineering Section, was placed in charge of air pollution activities, Research, Development &

WALTER SUYDAM

WILLIAM A. MORTON

Loftus Engineering executive posts

MAX GARBER

MALVERN J. GROSS

Consolidated Vacuum vice presidents

Consulting Div., **Roy F. Weston Inc.**, Newtown Square, Pa.

Walter Suydam was elected president, **Loftus Engineering Corp.**, Pittsburgh. **William A. Morton** was elected chairman of the executive committee in charge of foreign operations.

Harry S. Wilson was made manager of planning, **Atlas Steels Ltd.**, Welland, Ont.

Bailey Meter Co. appointed **H. R. Fulton** Eastern regional sales manager, with headquarters in Pittsburgh; **A. L. Danielsen** Western regional sales manager, with headquarters in Denver.

J. E. Workman, executive vice president, was elected president of **Latrobe Steel Co.**, Latrobe, Pa., succeeding **M. W. Saxman**, who continues as chairman.

Oakley N. Dean was promoted to vice president-manufacturing, **Exide Industrial Div.**, Electric Storage Battery Co., Philadelphia. He was manufacturing manager.

Joseph Toth was made Philadelphia district sales manager, **William T. Haddon Jr.** assistant general manager, steel sales, **Alan Wood Steel Co.**

Roy A. Dye Jr. was made assistant manager of **Republic Steel Corp.'s** Bar Sales Div., Cleveland.

Louis L. Smith Jr. was named Midwestern regional sales manager, Chicago, for **Hughes Aircraft Co.'s** Semiconductor Div.

Frederic C. Mayer was made assistant manager, stainless and wire products in the Sales Dept. of U. S. Steel Corp.'s **Tennessee Coal & Iron Div.**, Birmingham.

W. J. Burcham was made manager of the Sand Springs, Okla., Works of Sheffield Div., Armco Steel Corp. He succeeds **F. A. Westphal**, continuing with the company in a consulting capacity.

Max Garber was elected marketing vice president and **Malvern J. Gross** manufacturing vice president, new posts at **Consolidated Vacuum Corp.**, subsidiary of Consolidated Electrodynamics Corp. and the parent firm, Bell & Howell.

Ian F. Steven succeeds **Howard M. Smith**, resigned, as president of **American Spring of Holly Inc.**, Birmingham, Mich., subsidiary of Republic Industrial Corp. Mr. Steven remains in his present posts as president of both RIC Products Corp. and Cuyahoga Products Corp., subsidiaries. **John L. Moran** was made vice president-manufacturing of **Cuyahoga Products**, Cleveland.

H. J. Urbach, former executive engineer, was named director of engineering in **Timken Roller Bearing Co.'s** Engineering Div., Canton, Ohio. **Ralph E. McKelvey**, former assistant chief engineer of the Physical Laboratories, was promoted to assistant director-engineering.

Peter S. Given fills the new post

J. E. WORKMAN

Latrobe Steel president

OAKLEY N. DEAN

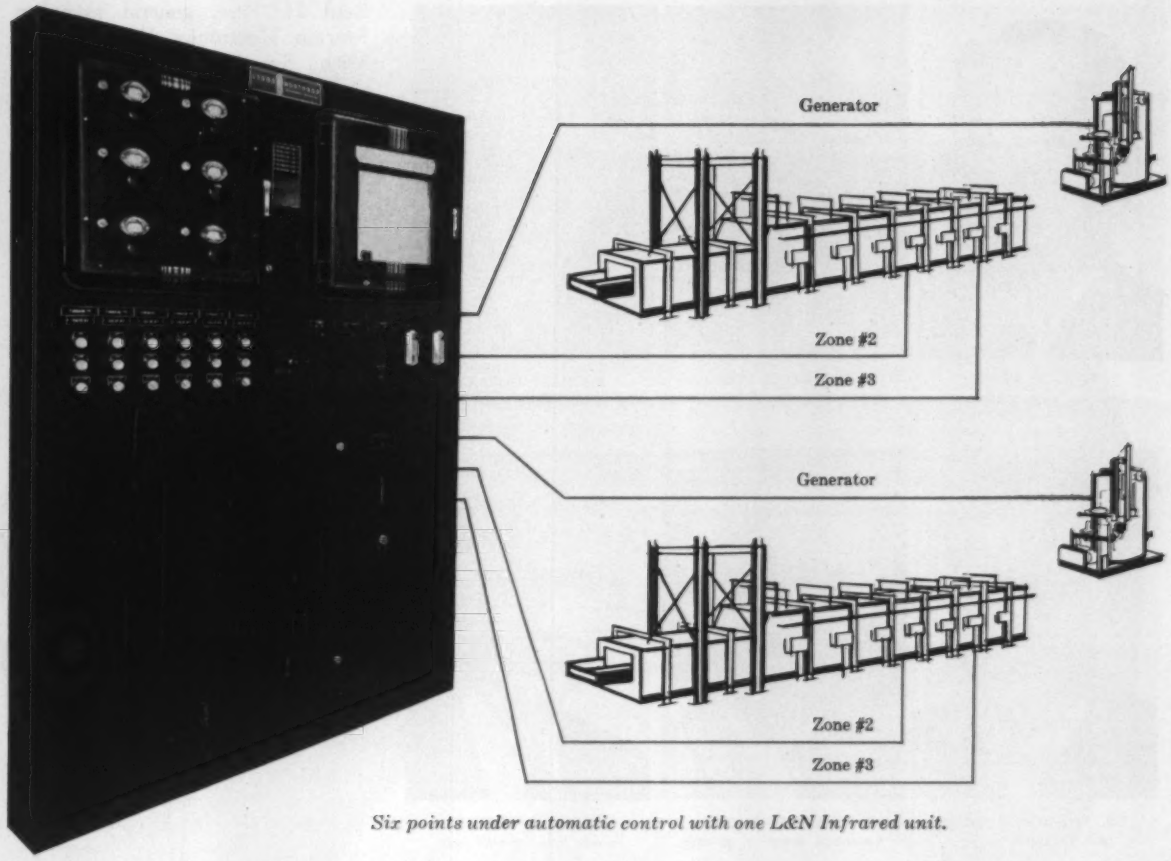
Exide v. p.-mfg.

W. J. BURCHAM

Sheffield-Sand Springs mgr.

H. J. URBACH

Timken engineering director



Six points under automatic control with one L&N Infrared unit.

New L&N Infrared Analyzer Package automatically holds furnace and generator atmospheres "in line"

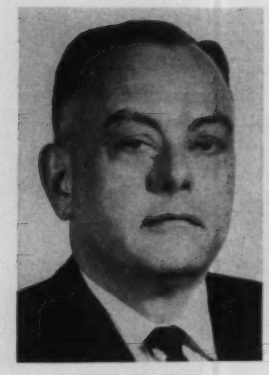
The L&N IR Analyzer equipment for automatic control of heat treating atmospheres offers five outstanding advantages.

- *It is rugged, reliable and easy to operate.*
- *It is a completely assembled package with all necessary "hardware" panel mounted, piped and wired.*
- *Each unit may be calibrated for either CO, CO_2 or CH_4.*
- *Calibration is accurate and positive . . . requires only three minutes, on-the-spot.*
- *Generator and furnace atmospheres of as many as six points taken from any location in your heat treat can be controlled by one unit.*

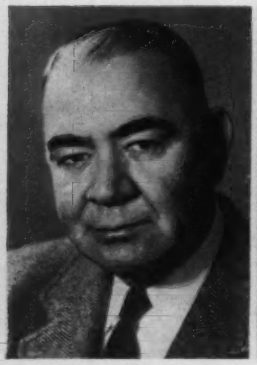
This new package of the time-proven L&N IR Analyzer, designed specifically for metallurgical use, is now automatically controlling atmospheres in a number of well known metalworking plants. It has earned the respect of management and operating personnel alike for its accuracy, dependability and ease of maintenance.

For more information request Folder N-91-620(1) from your nearest L&N office or write 4957 Stenton Ave., Phila. 44, Pa.

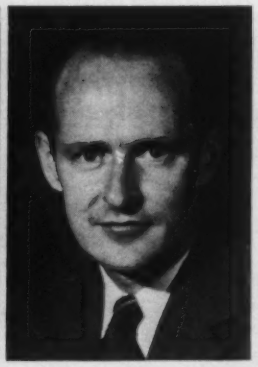
LEEDS LN NORTHRUP
Instruments Automatic Controls • Furnaces



RAUL H. FRYE
Sparton vice president



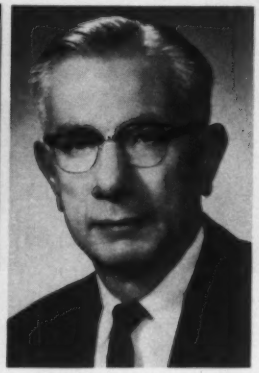
GEORGE H. YOST
Armco-Ashland Wks. supt.



MAURICE GORMLY
Cincinnati Milling div. mgr.

DR. WILLIAM A. BAIN
Air Products v. p.

ROBERT S. BAKER
American Brass v. p.-mfg.



ARTHUR E. LINDNER
Toledo Scale works mgr.

of manager, airborne products, **SKF Industries Inc.**, Philadelphia.

Dr. William A. Bain was elected vice president and general manager, Defense & Space Div., **Air Products Inc.**, Allentown, Pa. He was executive vice president of Vitro Laboratories.

Robert S. Baker was appointed vice president-manufacturing, **American Brass Co.**, Waterbury, Conn. Director of mill operations since 1952, he succeeds **Sydney H. Wardell**, retired.

George W. Miller was named president, **Textron Inc.**, Providence, R. I., to succeed **Rupert C. Thompson Jr.**, now chairman. **Royal Little** retired as chairman but continues as chairman of the executive committee and continues to direct Textron's operations in the field of acquisitions.

John Bridgewater was made New York assistant sales manger, **Republic Steel Corp.**

Arthur E. Lindner was made works manager; **Vickery W. Wyatt** manager of custom products operations for **Toledo Scale Div.**, Toledo Scale Corp., Toledo, Ohio.

Harry N. Beffort was promoted from production shops manager to works manager in charge of manufacturing at **Avro Aircraft**, Toronto, Ont.

William A. Romeiser was made general manager, Industrial Products Dept., Philadelphia, for **Sun Oil Co.** He succeeds **Francis F. Palmer**, currently retail sales manager, Ohio Valley region.

George Cadet was named manager of **Republic Supply Co. of California's** new Sacramento, Calif., branch.

Lloyd J. Ely was named a vice president, Foreign Trade Group, **Caterpillar Tractor Co.**, Peoria, Ill. He is succeeded as director of manufacturing for domestic operations by **Gordon Swardenski**, assistant manager of the Peoria plant since 1957.

Raul H. Frye, general manager, Sparton Electronics Div., Jackson, Mich., **Sparton Corp.**, was elected a vice president of the corporation.

George H. Yost was made general superintendent of the Ashland, Ky., Works of **Armco Steel Corp.** He succeeds **George H. Todd**, made assistant manager of the plant. **Paul G. Sammet** was named assistant general superintendent in charge of melting operations, and **John D. Patterson** assistant general superintendent in charge of rolling and processing. **William O. Richmond** was made superintendent-Open Hearth Dept., and **Austin M. Henderson** superintendent, East Processing Dept.

Maurice Gormly was made manager, Products Div., **Cincinnati Milling Machine Co.**, Cincinnati. He succeeds **Philip O. Geier Jr.**, recently made vice president and assistant general manager of the company. Mr. Gormly was director of the grinding wheel laboratory, and manager of the grinding wheel plant.

Robert S. Wright was elected vice president-International Trade, **U. S. Industries Inc.**, New York. In addition to co-ordinating over-all international trading activities, he will be responsible for operation of the International Div. of which he has been president the last two years.

James W. Brown was promoted to sales manager, **Indiana Forge & Machine Co.**, East Chicago, Ind. He was Chicago district representative.

Claude E. Luke was made production supervisor, **Prem S. Advani** technical supervisor of **Jefferson Chemical Co.'s** Conroe, Tex., plant.

Thomas Douglas succeeds **James T. Greenlee**, retired, as manager, Industrial Sales Div., **Imperial Brass Mfg. Co.**, Chicago.

OBITUARIES...

H. C. Allington, 61, vice president-sales, Eastern Div., **Colorado Fuel & Iron Corp.**, New York, died June 27.

Leon A. Swirbul, 62, president, **Grumman Aircraft Engineering Corp.**, Bethpage, N. Y., died June 28.

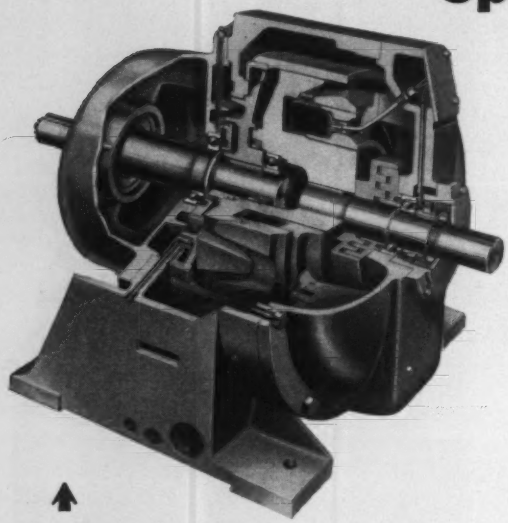
REMOVE 25% MORE METAL with a Nicholson or Black Diamond "Magicut" file. This extra efficiency comes from the "Magicut's" unique tooth structure. They're on an extreme angle...and termed "penetrating-planer" type. With each stroke the file takes a deep bite and leaves a smooth surface. • To get faster filing at lower costs change to a Nicholson or Black Diamond "Magicut" file. • Nicholson makes 6000 different types of files. Your industrial distributor will recommend the correct file for your job. And remember to ask him about the complete line of Nicholson Soft Faced Industrial Hammers.

***Our products are sold exclusively through industrial distributors. They offer you the finest goods and competent, fast service.**

NICHOLSON U.S.A. **NICHOLSON** BLACK DIAMOND U.S.A.

Nicholson File Co., Providence 1, R.I.
Files • Rotary Burs • Hacksaw and Band Saw Blades • Ground Flat Stock • Industrial Hammers

The BEST Solution to Difficult Speed Control Problems—

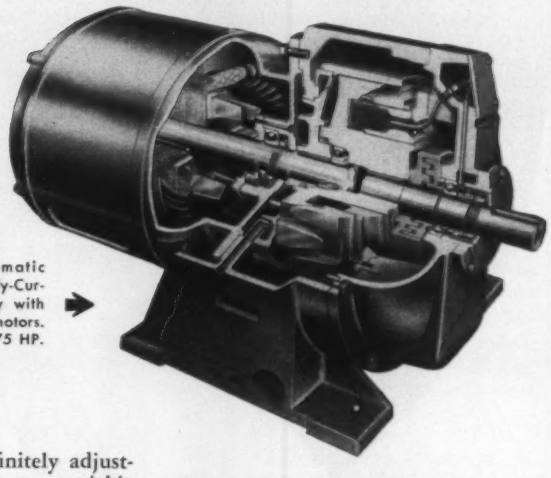


Dynamatic Liquid-Cooled Couplings provide infinitely adjustable speeds for nearly every application from 3 to 75 HP. Note the absence of slip rings, brushes, and commutators. Heavy-duty types with capacities up to 5,000 HP are also available.

EATON

DYNAMATIC®

LIQUID-COOLED EDDY-CURRENT COUPLINGS and DRIVES



"Dynaspede" Drives are Dynamatic Liquid-Cooled, Stationary-Field Eddy-Current Couplings mounted integrally with standard, D-flange, squirrel cage motors. Available in capacities from 3 to 75 HP.

Here's Why—

Dynamatic Liquid-Cooled Couplings and Drives provide infinitely adjustable speed from a constant speed source—or constant speed from a variable speed source. They operate on standard alternating current. Rotary power is transmitted through the coupling by an electromagnetic reaction between the driving and driven members of the unit—there is no mechanical contact of rotating members to cause wear and require adjustment or replacement.

A wide range of standard and special control features may be obtained from a remotely-mounted electronic control system. Infinite speed adjustment, constant speed control, on-off clutch control, torque limit, acceleration control, inching, and threading are a few of the many functions available. The addition of an eddy-current brake to standard couplings or drives provides smooth, cushioned stops and controlled deceleration.

Liquid-Cooled Dynamatic Couplings and Drives deliver more horsepower than other types of the same physical size, thus conserving space in a busy machine area. Efficient heat dissipation permits continued operation at low speeds, or stall with full load.

Completely enclosed, Dynamatic liquid-cooled units are protected from dust, dirt, and other atmospheric impurities. Dynamatic design involves no brushes or slip rings; there is no possibility of arcing. With simple modification these units can be made explosion-resistant for hazardous applications.

Infinitely Adjustable Speeds from AC Power

★

Full-Torque Starts

★

Wide Range of Control Functions

★

No Slip Rings, Brushes or Commutators

★

Completely Enclosed Design

★

Low-Cost Maintenance

Send for Our New Illustrated Bulletin.

EATON

DYNAMATIC DIVISION

MANUFACTURING COMPANY

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Alcoa Enlarging Mills as Sheet Demand Moves Higher

A SHARP RISE in demand for aluminum sheet products is predicted by marketing officials of Aluminum Co. of America, Pittsburgh. To meet consumers' needs, the firm will expend more than $18 million to expand and modernize its two major sheet mills—at Davenport, Iowa, and Alcoa, Tenn.

Initial spending for new buildings and equipment under the two year program will begin this summer, says Lawrence Litchfield Jr., executive vice president. Aim of the program is to achieve greater rolling capacity and improved production methods through the utilization of recent technological advances, he adds. Many of the additions and improvements will be aimed at enhancing Alcoa's ability to roll lighter gages of sheets at greater speeds and in larger volume.

Prominent among new equipment scheduled for Davenport is a tandem, four high, cold rolling mill and auxiliary equipment. At Alcoa, Tenn., where trial runs are underway on a multimillion dollar, four high, four stand, rolling mill installed as part of an earlier modernization program, additional new fabricating and supporting equipment will be installed.

Besides the equipment program, the project will involve a major expansion of plant warehousing facilities.

Under a separate program, Alcoa will spend about $500,000 to install improved heat treating equipment at the fabricating works of its Massena, N. Y., operations. Erwin G. Schoeffel is manager.

J&L Expands Lime Capacity

Blair Limestone Div., Jones & Laughlin Steel Corp., Pittsburgh, has put into operation two, new, gas fired, limestone kilns for producing burned lime. The two kilns have an annual rated capacity of 72,000 net tons, doubling the plant's capacity for J&L's steelmaking furnaces at Pittsburgh and Aliquippa, Pa. The new kilns produce burned lime with a marked decrease in the amount of contained sulfur (only 20 to 25 per cent as great as that in the older coke fired kilns, says G. E. Alter Jr., division manager). The new kilns replace 11 coke fired kilns which had been in operation at Martinsburg, Pa.

Armco Licenses Republic

Armco Steel Corp., Middletown, Ohio, has licensed Republic Steel Corp., Cleveland, to produce and sell the precipitation-hardenable stainless steels developed and patented by Armco. Republic has been granted also the right to use Armco's trademarks 17-7 PH, 17-4 PH, and PH 15-7 Mo to identify the licensed products.

Shenango Enlarges Plant

Centrifugally Cast Products Div., Shenango Furnace Co., Dover, Ohio, has completed a major plant improvement and expansion program totaling nearly $500,000. Equipment additions and relocations within the foundry and machine shop were designed to improve the handling, production, and finishing of ferrous and nonferrous centrifugal castings. Other improvements include enlarged research and testing facilities, general office modernization, and a new shipping building.

Aluminium Buys Smelter

Aluminium Ltd., Montreal, Que., and Enfield Rolling Mills Ltd. of England have formed a company to acquire the secondary aluminum smelter at Bradford, Yorkshire, presently operated by Enfield Rolling Mills (Aluminium) Ltd. The new company, Alcan Enfield Alloys Ltd., will produce from scrap and primary aluminum a large range of foundry alloys not normally produced at the primary aluminum smelters of Aluminum Co. of Canada Ltd., the principal subsidiary of Aluminium Ltd.

Aluminium also announces that its subsidiary, Aluminio del Uruguay SA, is expanding its fabricating facilities in Montevideo. A new, 1500 ton, extrusion press will be installed immediately and a rolling mill of 1800 ton capacity has been ordered for installation early next year. The plant's capacity will be doubled for production of aluminum sheets, foil, and extrusions.

Calstrip Buys Strip Mill

Calstrip Steel Corp., Los Angeles, will install a temper rolling mill during September. Principal use for the mill is the skin rolling of high luster finish stainless steel strip. It was designed also to permit quick roll changes. Calstrip is relocating other operations in a newly constructed building to provide space for the additional equipment.

Tubemaker Lets Contract

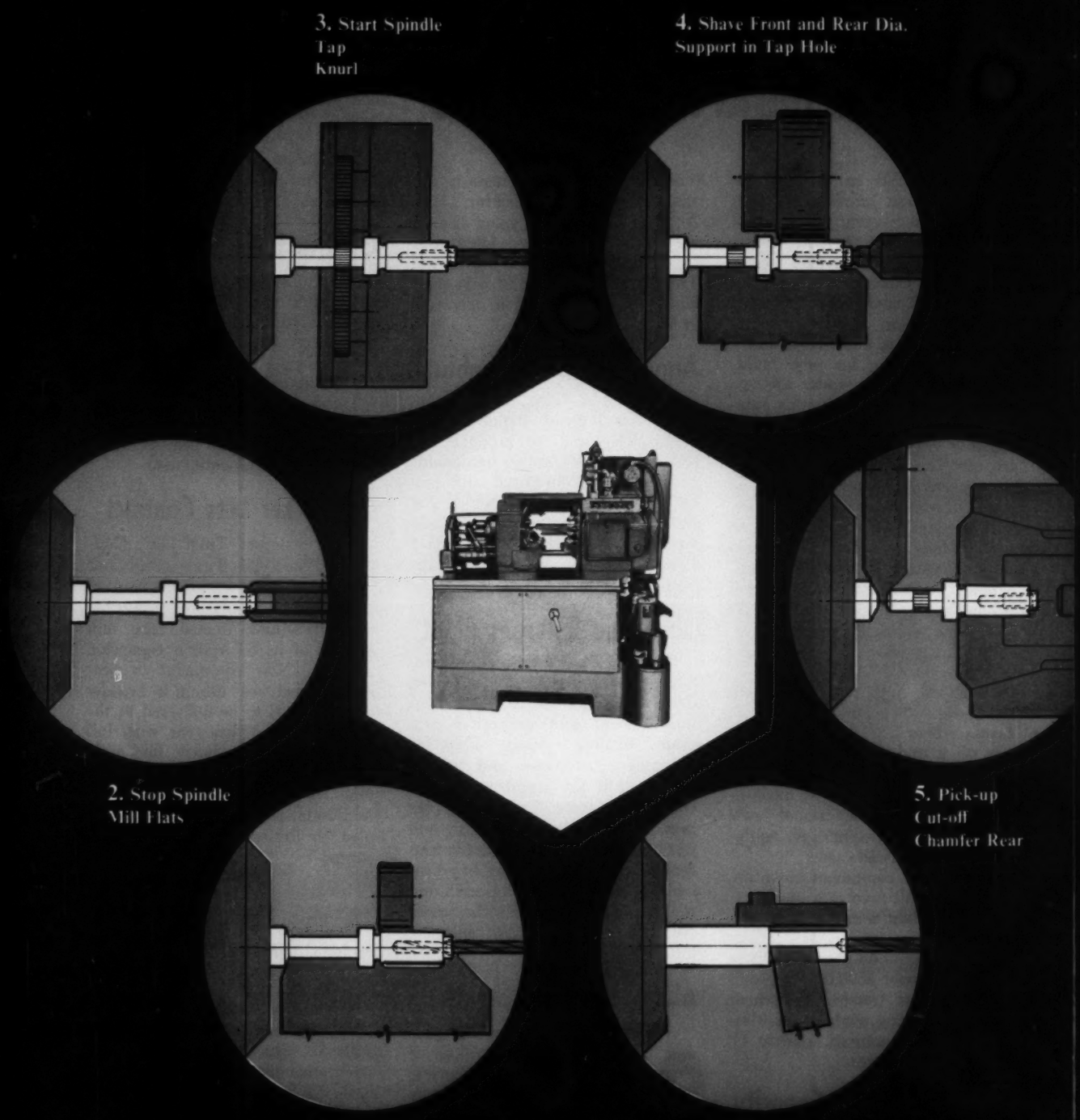
Ohio Seamless Tube Div., Copperweld Steel Co., Shelby, Ohio, has awarded a contract for erection of a 460 ft long building to house the company's new welded tube mill as part of its $3 million expansion program. New equipment to produce welded steel tubing in broader size ranges is to be delivered in the last quarter of this year with full scale operations slated for early 1961. Two of the company's welded tube mills are to be modernized. Additional improvements are scheduled for the seamless steel tube facilities.

NEW OFFICES

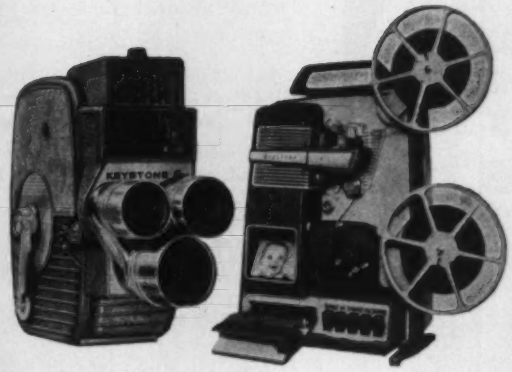
U. S. Steel Corp. opened a slag product sales office at 208 S. La Salle St., Chicago, Ill. District representative in charge of the office is G. M. Lakins. The South (Chicago) Works of the corporation normally produces 2 million tons of slag annually (100 carloads a day).

Northeast Ohio Machine Builders Inc. officially opened its engineering and administrative offices at 330 N. Main St., Columbiana, Ohio. The firm designs and builds special machinery for the ferrous and non-

(*Please turn to Page* 78)



9 operations in 3.8 seconds . . . one of the typical parts produced by Keystone Mfg. Co. on the 7/16" RA-6 Bar Automatic



85,000 Pieces Per Day And No Rejects

Production *facts* tell a typically impressive story of Acme-Gridley machining efficiency at Keystone Manufacturing Company, Boston, Mass.

"We have five 7/16" RA-6 Spindle Bar Automatics", states a Keystone executive. "Everyday, they produce an average of 85,000 precision parts for our cameras and projectors . . . and yet, there are literally no rejects. As a result of this consistent conformance to our tough tolerances, scrap losses have been wiped out and inspection time reduced to an all time low. What's more, because Acme-Gridleys produce in a single set-up jobs otherwise requiring secondary machining, we've cut production costs."

Dramatic and *tangible* savings like those realized by Keystone are commonplace with Acme-Gridleys. Such features as a wide open tooling zone, direct camming and independently operated tool slides can help you achieve higher mass production efficiency at lower cost. We'll be happy to supply complete information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction
Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Keystone Manufacturing Co. . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

National Acme

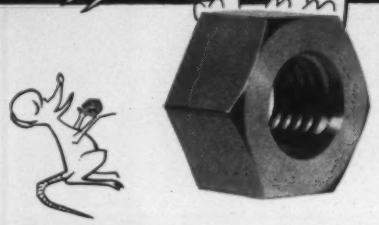
The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

MMT-PE

RANGE OF SIZES AND THREADS

Here you see the smallest and largest hex sizes produced by Fischer with the finest and coarsest standard threads. The miniature is 1/8" x 3/64" with 0-80 threads . . . jumbo is 1 1/16" x 39/64" with 5/8-11 threads.

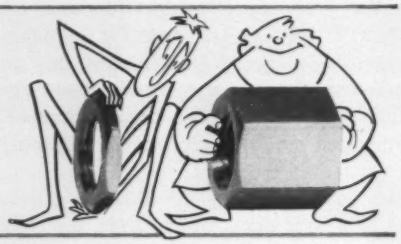


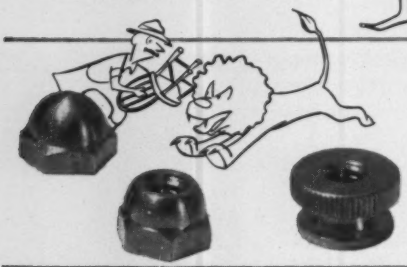
RANGE OF THREAD DIAMETERS

Turned from 1 3/16" hex stock, these nuts illustrate variation in I.D. obtainable in same blank size (depending on thread specified). One is 11/16" I.D., the other only 1/4".

RANGE OF LENGTHS

Both these nuts are 5/8" O.D. with 7/16" thread diameter. The husky one is 5/8" long, the other 3/32". In specific nut sizes, maximum length is determined by thread pitch and thread I.D.



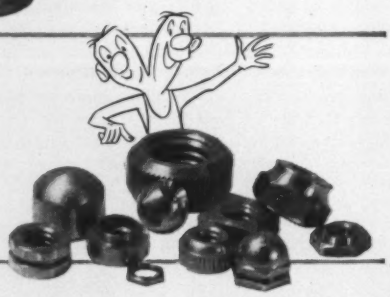


RANGE OF STANDARD TYPES

In addition to hexagon nuts, Fischer also supplies cap (acorn), open-end cap, knurled thumb, battery and fixture nuts in a range of sizes with standard/special threads.

ODD SIZES, SHAPES & THREADS

. . . are another specialty with Fischer. In fact, we have produced more than 3400 different types of non-standard brass and aluminum nuts. What do *you* need?



there's no premium for precision at

Fischer

FISCHER SPECIAL MFG. CO.

476 Morgan Street • Cincinnati 6, Ohio

FISCHER IS THE LEADING PRODUCERS OF PRECISION TURNED BRASS AND ALUMINUM NUTS . . . TO YOUR SPECIFICATIONS!

Whatever your requirement, Fischer can assure you of premium quality and prompt "on schedule" deliveries at competitive prices. WRITE FOR CATALOG FS-1000.

8908-FS

(*Cocluded from Page* 75)

ferrous metal and forest product industries.

J. O. Ross Engineering Div., Midland-Ross Corp., New York, is opening a sales office in Mobile, Ala. It's headed by R. C. MacDuffee. The division makes air processing equipment.

Miniature Precision Bearings Inc., Keene, N. H., opened a sales office in Redwood City, Calif., under the direction of Ray Sparks. The office is a branch of MPB's Western technical center and sales office in Los Angeles.

NEW ADDRESSES

Traylor Engineering & Mfg. Div., Fuller Co., Allentown, Pa., moved its San Francisco office to 564 Market St., that city. E. B. Greef is district manager. Traylor makes machinery for the mining and processing industries.

Bethlehem Steel Co. moved its Pacific Coast Div. general offices and the San Francisco district sales office to 1000 California St., that city.

CONSOLIDATIONS

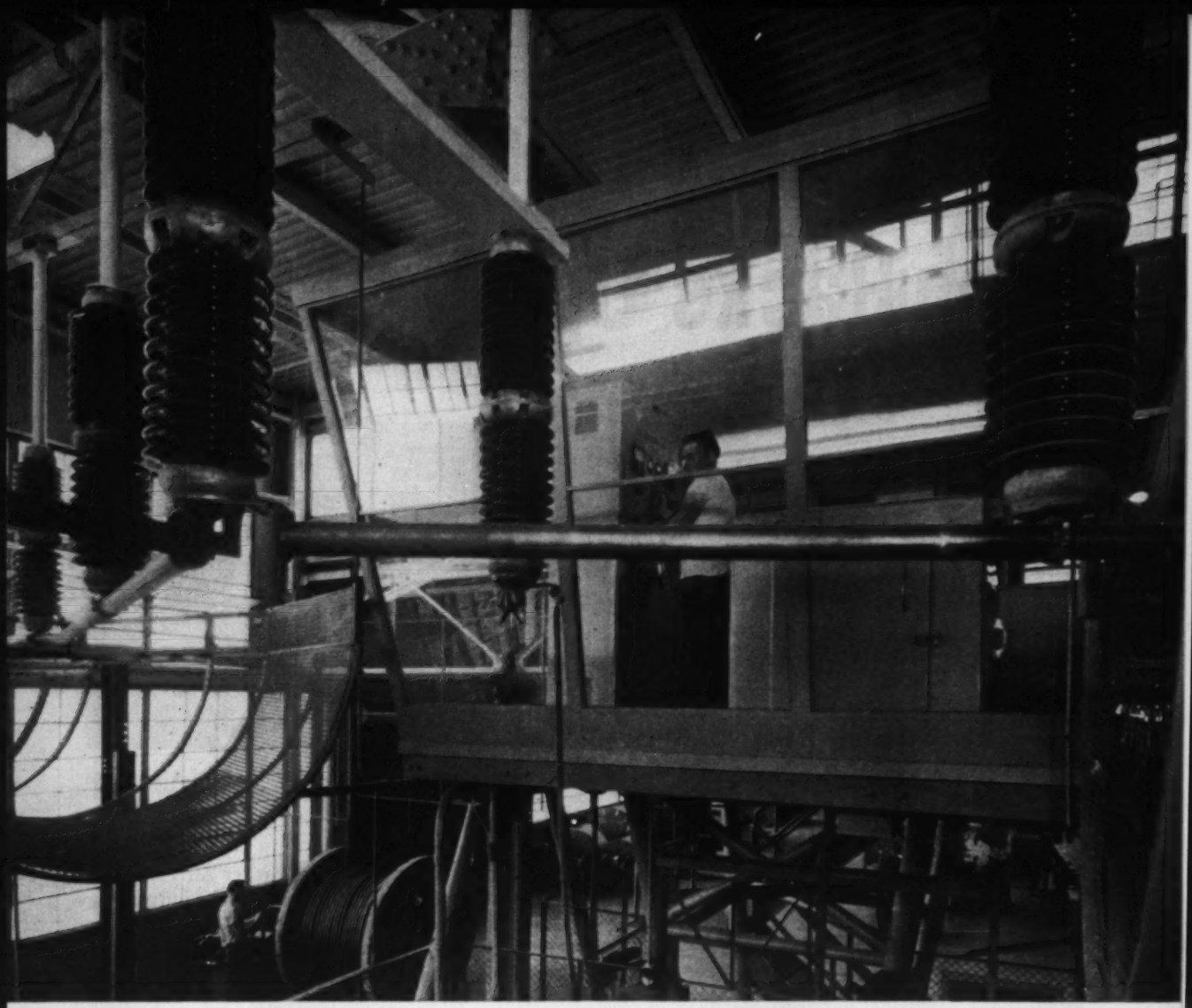
Kendall Machine Tool Sales and **Collison Tool Supply Co.** have merged to form Kendall-Collison Inc., 6915 W. Capitol Dr., Milwaukee.

Eastman Mfg. Co., Manitowoc, Wis., and **Imperial Brass Mfg. Co.,** Niles, Ill., will merge, subject to approval of stockholders.

General Steel Castings Corp., Granite City, Ill., purchased **St. Louis Car Co.,** supplier of railroad and rapid transit equipment.

Black & Decker Mfg Co., Towson, Md., maker of portable electric tools, acquired **DeWalt Inc.,** Lancaster, Pa., a subsidiary of American Machine & Foundry Co., New York. DeWalt makes radial woodworking equipment and will continue op-

(*Please turn to Page* 83)



Shown here is a section of final testing area. Voltage tests are being applied to *full reel lengths* of cable before shipment.

ANOTHER BIG REASON WHY YOU SHOULD CONSIDER ANACONDA BUTYL (AB) CABLE—

SPECIALIZED QUALITY CONTROL AND INSPECTION

From the start: Raw-material suppliers are required to submit certified test reports. Then, tests and sampling at our plant offer extra protection even before production begins. **To finish:** Here's the final inspection line where the finishing touches are applied and where every inch of cable is carefully inspected. Perhaps you already know that Anaconda test procedures are much above industry standards. But do you know that test voltages on Anaconda Butyl (AB) Cable are 125% of industry standards—that minimum corona level is 150% of rated voltage to ground?

Quality control at Anaconda is *more* than mere testing and inspection. It is built into every manufacturing step. That's why you can be sure your Anaconda cable will be of high quality—why you can be sure Anaconda Butyl (AB) Cable is the finest rubber-insulated cable you can buy.

Everything you need to know about Anaconda Butyl (AB) high-voltage cable is neatly summed up in a new booklet, DM-5903, "Anaconda High-Voltage Durasheath* Cable." For your copy, write to: Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y. *Reg. U.S. Pat. Off. 60230

ASK THE MAN FROM

ANACONDA®

ABOUT BUTYL (AB) HIGH-VOLTAGE CABLE

Superior Pre-Paint Protection Racks Up More Sales,

Paint Adhesion of Air Conditioning and Heating Registers, Grilles and Diffusers Insured by Granodine

Precision forming equipment turns coil stock steel into product at Krueger plant.

At major parts producer, Krueger Air Conditioning Corporation, registers, grilles and diffusers are treated with Amchem Granodine before painting to provide them with what Krueger officials agree is a "superior finish that extends the life of our products."

FINISHING PROBLEM SOLVED

Before selecting Granodine as their standard phosphating treatment, Krueger had tried several competitive processes but were unable to sustain the final quality or eliminate rust from painted products. The results—customer complaints and rejects running up to 10 percent of total production.

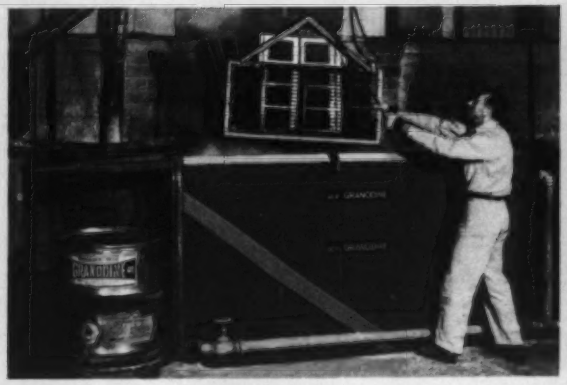
Today, after three years of utilizing Granodine in a five-stage dip phosphating process, Krueger, one of the world's largest manufacturers of registers, grilles and diffusers reports virtually no rejects, increased volume and an all-around better paint finish.

COMPARISONS SELL

To tell their superior finish story Krueger sets up effective side-by-side demonstrations of untreated products and products treated with Granodine at heating trade shows. Customer interest in such displays is high and has led to more sales through

Krueger management-manufacturing team: Left to Right—J. B. Smith, Vice-President of Production; President Leo Krueger; and Ted Kleckner, Vice-President and Comptroller.

# of Amchem GRANODINE* Fewer Rejects For Krueger



Operator employing electric hoist, lowers load of Krueger products into Granodine dip tank.

Paint line conveyor carries painted Krueger products from water-washer spray booth to inspection area.

graphic illustration of competitive advantages on Krueger's part.

Further support comes to Krueger through the use of Granodine when bidding for and successfully securing Government contracts and projects involving architects where rigid specifications exist for pre-paint finishing.

NEW SYSTEM PLANNED

Looking to the future, Krueger—with a 400 percent increase in sales over the last six years—is currently adding a new 10 acre, 100,000 square foot plant. High on the planning list is a new and virtually completely automated Granodine line. Amchem engineers have designed a unique conveyorized system utilizing overhead cleaning, rinsing and coating of Krueger products which will achieve significant cost savings and substantial reduction in gas consumption through a colder method in the clean-coat phase of the process.

If you are interested in a *superior finish* for steel products—it will pay you to investigate Granodine, the *superior phosphating* process. Your local Amchem Representative can supply the details on how you can quickly and conveniently make the switch to Granodine without interrupting production or re-designing processing facilities, while providing a substantial increase in quality of product finish!

Write for Bulletin 1380B containing detailed information on Granodine for steel . . . the finish that lasts.

*Granodine is Amchem's registered trademark for the conversion coating chemical used to produce phosphate coatings on steel.

AMCHEM ® GRANODINE

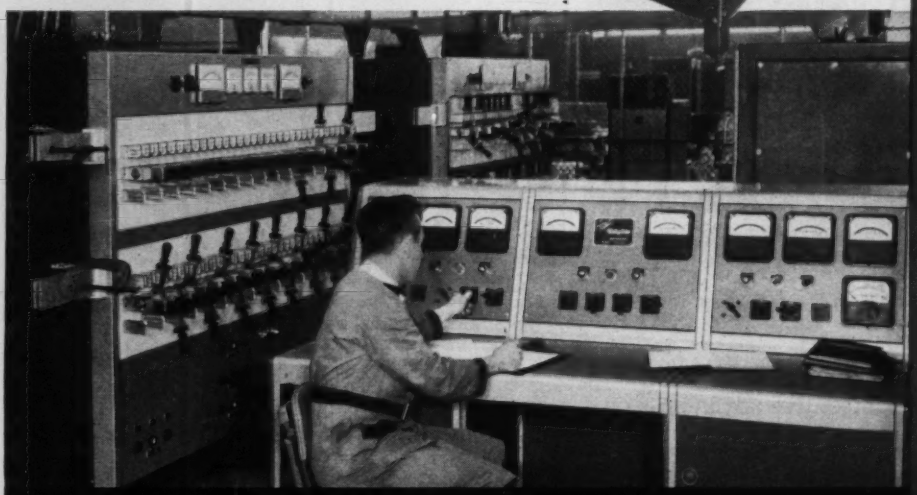
Amchem is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)

AMBLER, PA. • St. Joseph, Missouri • Detroit, Michigan • Niles, California • Windsor, Ont.

Your new Udylite rectifier is

FULL LOAD TESTED

before it leaves our plant



At the Udylite Load Bank Test Center your new rectifier must pass the most rigorous of inspections before you're even allowed to place it in service. *Every* Udylite rectifier must pass these tests—being made to meet highest product-in-performance standards at *Full Load Capacity*. The tests, run on specially developed equipment, minimize the element of human error and guarantee you finest possible manufacture. Here's what you can count on:

- ★ absolute soundness . . . freedom from defective components.
- ★ elimination of performance standards guesswork by Full Load Test.
- ★ your unit fully checked out . . . ready to hook up and go to work.

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To gain this truly comforting assurance choose Udylite Rectifiers, the finest electrical equipment, designed expressly for the plating industry by Udylite. Check with your Udylite man or write to:

the **udylite** corporation

detroit 11, michigan

on the west coast: L. H. Butcher Co.

(*Concluded from Page 78*)

erating as a subsidiary of Black & Decker.

Heli-Coil Corp., Danbury, Conn., acquired **Phelps Mfg. Co.**, Westport, Conn., and will operate the property as its Phelps Mfg. Div. G. P. Dodge is vice president in charge of the division.

Wanskuck Co., Providence, R. I., purchased the **Production Machine Co.**, Greenfield, Mass., manufacturer of centerless grinders and polishing machines. A. J. Spada has been appointed general manager of Production Machine.

NEW PLANTS

Refractories Div., Ferro Corp., Crooksville, Ohio, will build a $300,000 plant in the Los Angeles area. The facility is expected to go into operation later this year.

Polymer Corp., Reading, Pa., is constructing a plant in Rolling Meadows, Chicago. The principal operations at the facility will be plastic coating of metal products and the demonstration of the coating system to prospective licensees.

Pennsalt Chemicals Corp., Philadelphia, is operating its new 34,000 sq ft plant in College Park, Atlanta. Area manager is R. F. Ragsdale; plant supervisor, L. J. Browder.

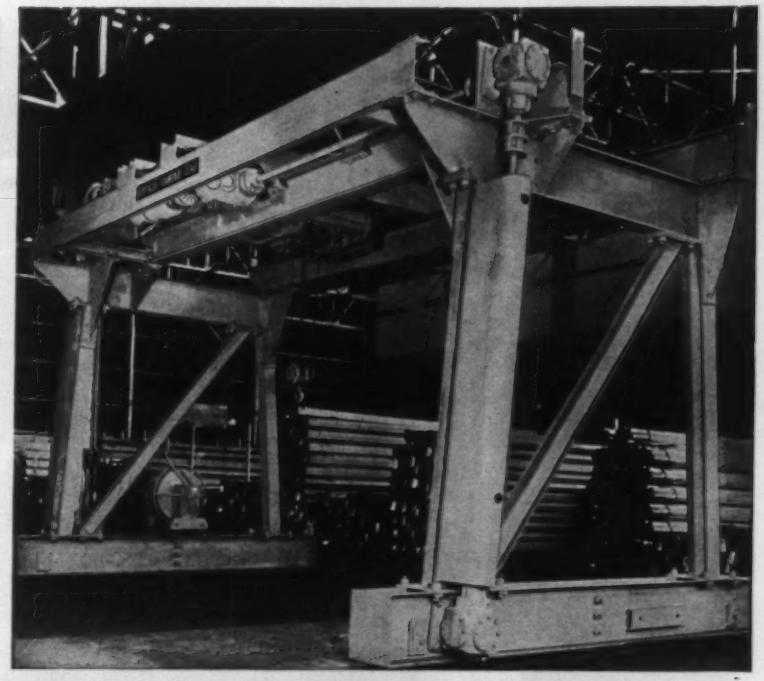
Palumbo Bros. Inc., Newark, N. J., is erecting a building in Linden, N. J., to house its new Electronics Div. To be known as Platronics, the division will specialize in specification electroplating of electronic components with precious and base metals.

Ward Steel Co., Cambridge, Mass., is constructing a steel service center in Greensboro, N. C. Ross Allen will be the manager of the branch which is scheduled to start operations by Oct. 1.

C. M. Kemp Mfg. Co. Inc., Baltimore, designer and engineer of industrial processing equipment, plans to erect a 29,000 sq ft manufacturing building and a 10,000 sq ft office building south of Ferndale, Md. W. Kemp Lehman is president.

Fansteel Metallurgical Corp.,

(*Please turn to Page 86*)



CHICAGO TRAMRAIL

GANTRY CRANES

At the modern plant of one of the country's largest aluminum companies, Chicago Tramrail Gantry Cranes handle long extruded pieces from a 14,000-ton extrusion press . . . transfer these pieces to other operations throughout the mill.

Fourteen Chicago Tramrail Full Gantry Cranes provide individual handling equipment for individual operations to eliminate waste time waiting for busy overhead cranes. Designed for heavy-duty, continuous service, these Gantries are built with maximum headroom and maximum clearance between legs to operate independently under the large overhead cranes.

For a practical, economical solution to your materials handling problems, see our experienced engineers. Special designs, sound engineering and broad application knowledge qualify us for helpful service.

CHICAGO TRAMRAIL CORPORATION

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OVERHEAD CRANES • JIB CRANES • STACKER CRANES • MONORAIL SYSTEMS

FOR THE MACHINERY PART

THAT TAKES THE BEATING

A cut-off knife made of HAYNES STELLITE alloy No. 19 slices through molten glass at 2200 deg. F. Despite the intense heat of the glass being molded into tumblers, and the severe erosive action of the glass on metal, the cut-off knife maintains a 0.015-in. clearance between itself and the mold ring . . . *far longer than any other material ever used.*

Are you looking for a tough metal part to improve your machinery? It will pay you to look into HAYNES alloys. There are more than 15 from which to choose, including HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. Parts can be furnished machined or ground to specified size and finish.

Our engineers will help you pick the right HAYNES alloy to resist many conditions of wear, heat, or corrosion.

HAYNES Alloys *will do the job!*

HAYNES ALLOYS

HAYNES STELLITE COMPANY

Division of Union Carbide Corporation

Kokomo, Indiana

UNION CARBIDE

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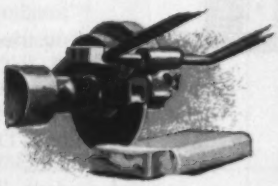
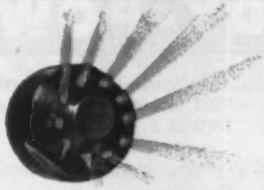
TYPICAL "HAYNES" ALLOY MACHINERY PARTS



Tough, long-lasting metal-cutting saws over 20 inches in diameter, made of HAYNES STELLITE alloy sheet, slice the tops off copper ingots.



Steam atomizer fuel burner nozzles of HASTELLOY alloy C resist corrosive agents and erosion for months, retaining essential contours.

High-temperature strength and corrosion resistance of diesel combustion chambers made of HASTELLOY alloy C make them "good for life of the engines."

LP-Gas Model HA-3 with recessed housing can be installed on sit-down trucks without seat alteration.

Ready-Power Units Power Trucks At Lowest Cost Per Ton-Mile

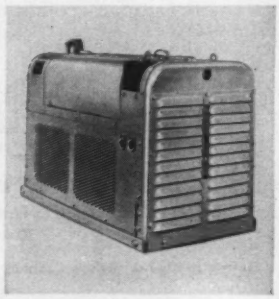
ASSURE FULL-TIME POWER FOR YOUR ELECTRIC TRUCK

It costs you less to move materials when your electric truck is equipped with Ready-Power. The compact Ready-Power Unit consists of a dependable industrial engine and DC generator. It is easily installed or interchanged on practically any make of truck and generates full capacity power whenever needed. There is no power lag, no truck slowdown. Ready-Power also eliminates the constant recharging and replacement of stored power.

Save money and assure full-time power for your materials handling vehicles. Mail the coupon below for complete information on Ready-Power Units.

SERIES HA FOR FORKS UP TO 8,000 LBS., PLATFORMS UP TO 10,000 LBS.

Ready-Power Series HA Units are designed for use with medium size fork, platform and crane trucks. They are available with gasoline or LP-Gas fueling systems, with conventional housing for stand-up trucks or recessed housing for sit-down trucks.



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Detroit 8, Michigan

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Company_____

Address_____

City_____ Zone___ State_____

(*Concluded from Page 83*)

North Chicago, Ill., now offers off-the-shelf delivery of tantalum, tungsten, molybdenum, columbium, and their alloys. These metals are offered in such popular forms as wire, rods, foil, sheets, and plates.

Whitehead Metals Inc., Baltimore, will erect a 35,000 sq ft service center and office at the Meadow Industrial Park, Baltimore County, Md. Occupancy is expected by November of this year.

ASSOCIATIONS

Purchasing Agents Association of New York Inc. elected these officers: President, G. C. Fordyce, American Cyanamid Co.; first vice president, D. T. Keliher, U. S. Metals Refining Co.; second vice president, C. B. Adams, General Electric Co.; and treasurer, L. A. Norris, Dreyfus & Co. R. H. A. Davis is executive secretary.

Purchasing Agents Association of Chicago elected these officers: President, D. L. Harwood, Fairbanks, Morse & Co.; first vice president, H. A. Berry, Chicago, Rock Island & Pacific Railroad; second vice president, R. B. Berry, deputy purchasing agent for the City of Chicago; secretary, L. R. Seen, Borg-Warner Corp.; and treasurer, Walter Armstrong, American National Bank & Trust Co.

Philip C. Smith, Everett Steel Foundry, General Electric Co., Everett, Mass., has been elected president of the **New England Chapter, American Foundrymen's Society.** Other officers are: First vice president, L. W. Greenslade Jr., Brown & Sharpe Mfg. Co., Providence, R. I.; second vice president, H. K. Sleicher, Seaboard Foundry Inc., Johnston, R. I.; secretary, D. J. Pendergast, Sterling National Industries Inc., Boston; and treasurer, T. I. Curtin Jr., Waltham Foundry Co., Waltham, Mass.

Wire Reinforcement Institute Inc., Washington, elected as president, B. D. Bennett, American Steel & Wire Div., U. S. Steel Corp., Cleveland. Frank B. Brown is managing director.

Here are thread and form grinders that give you toolroom precision plus production line speed.

Plunge grind threads 1¾" long in a turn and a half

or traverse grind long threads as fine as 60 pitch

And you have a choice of Crushtrue® wheel dressing (or multi-rib or single-rib diamond wheel-dressers) with manual or automatic crushing. Furthermore, Crushtrue dressing is ideal for grinding intricate profiles.

Sheffield's versatile standard Thread and Form Grinders (Model 101, illustrated, capacity 7″ diameter x 12″ long; Model 103, 7″ diameter x 24″ long) are equally at home in the tool room making one of a kind precision threads, or in the production line plunge grinding thousands of threaded or profiled parts.

Wheels may be diamond dressed . . . or Crushtrue® dressed for these advantages:

Greater production: wheel is sharper, grinds cooler. Faster stock removal: no dull flats, no burning, no loading up. Faster redressing: wheel is redressed in seconds. Highly accurate: tolerances on width within .0002″, radii within .002″, straight sides within .003″. RMS finishes as low as 8 microinch, grooves as narrow as .020″.

Standard accessories and special loading, holding, and ejection devices can be made available for specific high production jobs.

May we send you TFG 1159 catalog on models 101 and 103 and Bulletin CR 355 on the remarkable advantages of Crushtrue® grinding?

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Gages, Measuring Instruments, Automatic Gaging & Assembly Systems • Machine Tools • Contract Mfg.

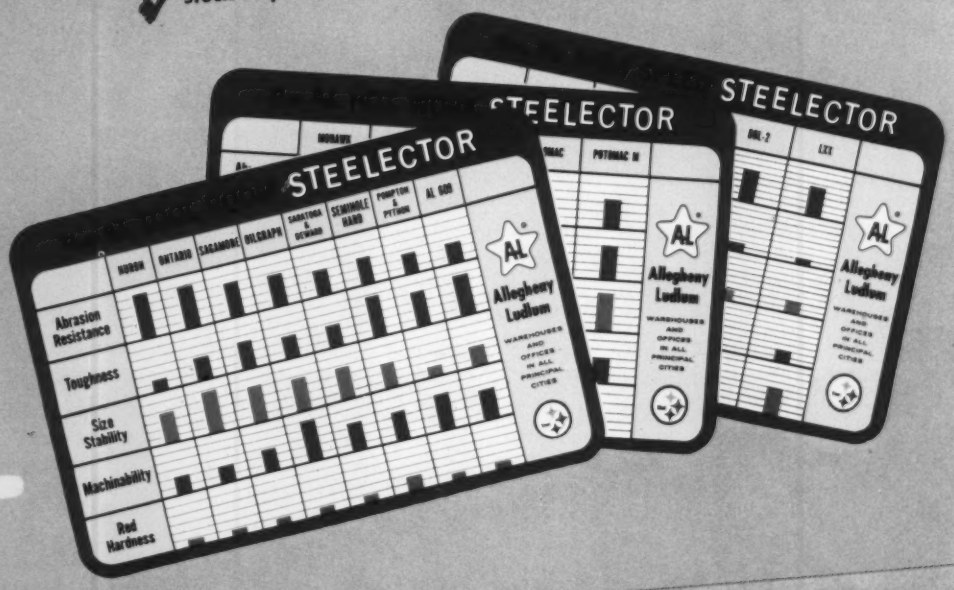
Make a Fast...Easy...Accurate Selection of

and know your size, shape, and grade are

The Allegheny Ludlum Tool Steel

STEELECTOR

- every type needed for 96% of all tool steel applications
- easy selection of the proper tool steel based on its individual characteristics
- stock shipment of grade and size assured at selection time



the Proper Tool Steel for any Application

Available with the A-L Steelector Program

easy answer to an old problem

Starting right now, the common problem of selecting the right tool steel for any job can become a thing of the past. With A-L's new STEELECTOR Program, you can make a *first time choice* of the proper grade for any application . . . and make it FAST, almost at a glance.

eliminates guesswork

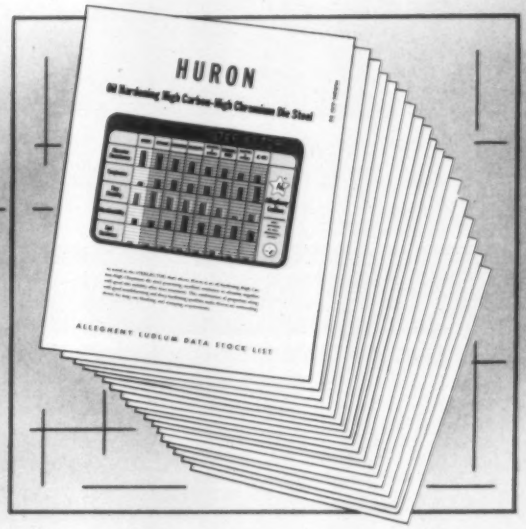
The STEELECTOR is ACCURATE, eliminating guesswork, trial runs, and expensive mistakes. And best of all, the STEELECTOR gives you a choice of tool steels that are AVAILABLE . . . in stock, right now! And they'll *stay* available . . . with a new, increased stocking program. STEELECTOR Grades are stocked according to a study of today's needs and will be reviewed periodically to fit changing requirements.

here's how it works

In the new program, a STEELECTOR Card covering each group of steels (Tool Room, Hot Work, and High Speed Grades) will help you select one particular grade as the best for your application. The STEELECTOR presents five basic tool steel properties—Abrasion Resistance—Toughness—Size Stability—Machinability—Red Hardness—as bar graphs, with the length of the bar showing the extent of each property in every STEELECTOR Grade. Find the properties most important to you and, by inspection, pick the grade with the characteristics you need.

availability assured

There is a separate Data Stock List for each STEELECTOR Grade, showing its complete range of warehouse stocks, as well as technical



data and basic application information. So, you can be sure the grade, size, and shape of your choice is in stock.

quality assured

And you can count on Allegheny Ludlum quality in every STEELECTOR Grade. They are selected from the complete line of A-L Tool Steel and made under the rigid quality control standards of all A-L products.

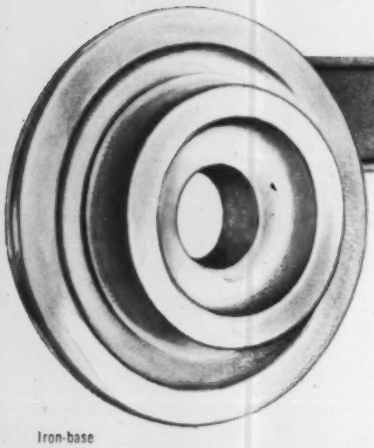
details available

It's all explained in the colorful A-L Tool Steel STEELECTOR Booklet, which includes STEELECTORS for the Tool Room Grades, Hot Work Grades, and High Speed Grades, and explains the Data Stock Lists for every STEELECTOR Grade. Ask your Allegheny Ludlum Sales Representative for your copy, or write: Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. Ins. 7.

STEELECTOR PROGRAM

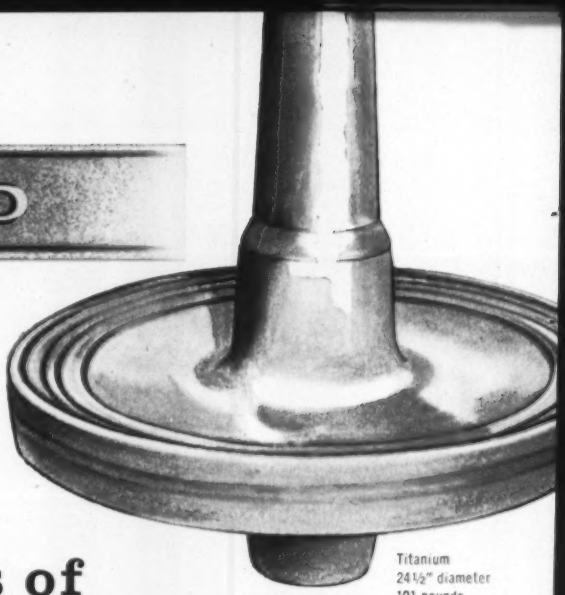
ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country



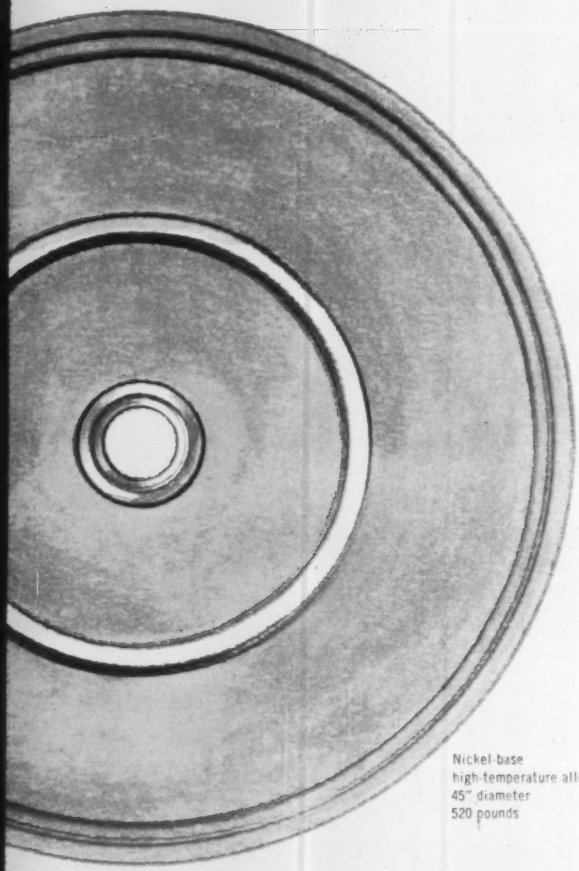
Iron-base
high-temperature alloy
21½" diameter
244 pounds

FORGED



Titanium
24½" diameter
191 pounds

To speed the progress of gas turbine development

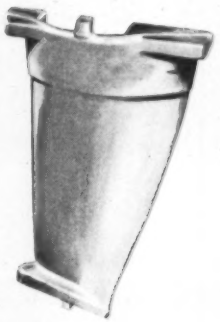


Nickel-base
high-temperature alloy
45" diameter
520 pounds

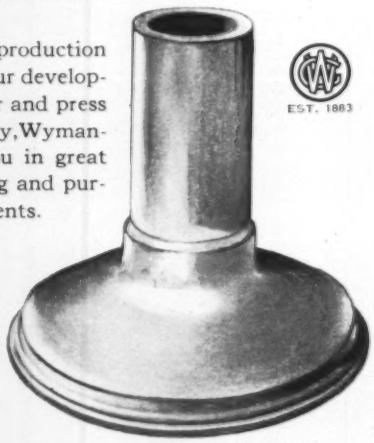
For applications ranging from automotive to aircraft propulsion, Wyman-Gordon is the world's largest producer of forged components for the gas turbine industry—turbine wheels, compressor discs, blades and vanes, for stationary turbines, nuclear installations, aircraft and missiles.

Wyman-Gordon's production experience includes forgings of a wide range of metals from low-alloy high-strength steels—titanium—intermediate temperature alloys—to the super-nickel-base alloys and refractory metals. *Guaranteed minimum properties* assure improved performance and dependability, and enable designers constantly to raise their sights and increase turbine capabilities.

With unexcelled research and production laboratories to concentrate on your development problems and with hammer and press capacity unequalled in the country, Wyman-Gordon is prepared to serve you in great depth at the design, engineering and purchasing stages of your requirements.



Titanium
15½" length



High-strength steel
19" diameter
143 pounds

EST. 1883

WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS — WORCESTER MASSACHUSETTS — DETROIT MICHIGAN

GRAFTON MASSACHUSETTS — LOS ANGELES CALIFORNIA — PALO ALTO CALIFORNIA — FORT WORTH TEXAS

WEAR RESEARCH— Metal wear will get close scrutiny at Armour Research Foundation of Illinois Institute of Technology, Chicago. Ten firms are backing a research program to find out why metal wears. Expected benefits include longer life alloys for piston rings, bearings, and gears.

ATOMIC FUEL NOTE— First test results of uranium-carbide fuel elements should be available shortly, industry sources tell STEEL. Heat conductivity is said to be three times greater than that of current fuels, and it's more efficient: It uses up more of the uranium content than other systems.

CHEAPER CONSTRUCTION COSTS— Monsanto Chemical Co., St. Louis, says it can build a dome to enclose 280 sq ft with $18.20 worth of plastic foam.

DRIPPY GLASS— By picking the right composition, you can get an inorganic glass that's still liquid at room temperatures. Such compositions don't crystallize or lose their glassy properties over long periods of time, claim A. D. Pearson and W. R. Northover, Bell Telephone Laboratories, Murray Hill, N. J. Color varies, and the index of refraction is high. The formula contains arsenic, sulfur, bromine—no silicon.

SINTERED STATORS— Emerson Electric Mfg. Co., St. Louis, will replace laminated stators and rotors with a sintered style if its long range development program proves successful, STEEL learned recently.

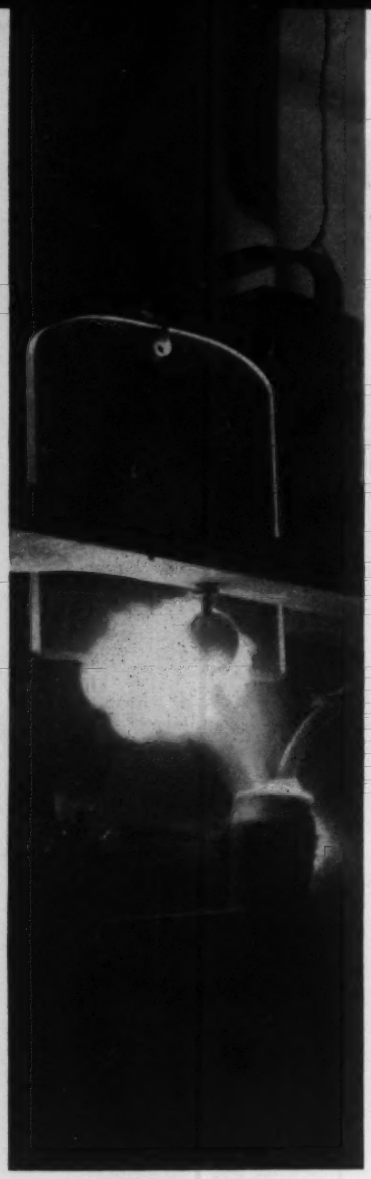
SPLAT COOLING— Keep your eye on a process called "splat cooling" that creates new metallic alloys by blasting a molten droplet of a pure metal or alloy against the rim of a refrigerated metal wheel spinning at high speed. The droplet is cooled at the rate of 2 million° F per second, quick-freezing it as a small piece of thin foil before the atoms have time to realign themselves. A fine grain structure is created. Developed by Dr. Pol Duwez at California Institute of Technology, it has at least three implications: 1. New electrical and magnetic properties may be discovered. 2. It could bring about new superconductive alloys. 3. Improved semiconductivity may result.

BLUE SKY OPEN HEARTH— Ford Motor's Steel Div. engineers are studying a large, open hearth type furnace with these features: High oxygen inputs both above and below bath level, no checkers, drafting both ways, two boilers, hot primary charge. Such a furnace would combine high production of other processes and flexibility of the open hearth, believes G. A. Ferris, open hearth and electric furnace manager.

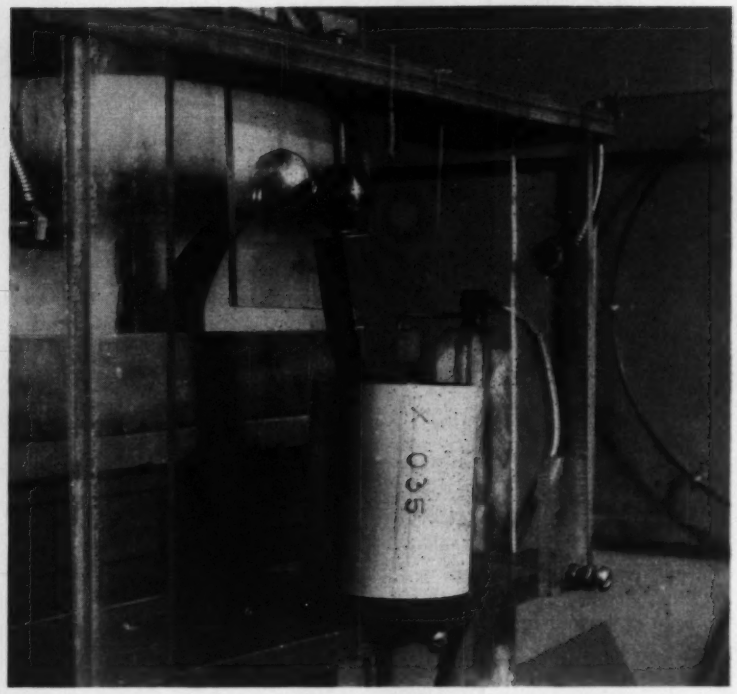
SIMPLIFIED ELECTRONICS—Scientists at IBM, New York, have come up with a method to replace several components with a single crystal. It is said to be a major advance in making more complex, high speed computers and electronic devices more compact.

STAINLESS SHINES— For heat exchangers operating above 300° F, seamwelded stainless steel tubing without stabilizing heat treatment seems to give the most economical anticorrosive service, claims Sinclair Refining Co., New York. Chlorides are avoided.

SPECK CHECKER— Automatic particle size analysis is said to be much easier with a device which employs beta rays emitted by carbon 14. It works with particles between 1 and 500 microns, providing data in minutes. Applications include quality control of paints, ores, and explosives.



Spark furnishes 6000 horsepower to bulge aluminum tube. Power input can be varied



Start of spark forming shows initial position. Tube is 2½ in. in diameter, 3 in. long, with 0.035 in. wall

Hydrospark Forming Offers Control, High Accuracy

High energy rate forming without explosives uses an underwater spark to develop high pressures in a shock wave. Dies are inexpensive. Electrical energy is stored in condensers

A HIGH ENERGY RATE forming technique described as "underwater lightning" is attracting a lot of attention among fabricators of aircraft and missile parts.

Properly known as hydrospark forming, the technique has most of the advantages of explosive forming without some of the disadvantages. The method is still at the experimental level, but STEEL has learned that at least one company is close to the development of a machine tool using the hydrospark principle.

• A high intensity electrical spark discharged in water exerts hydraulic pressure to deform metals.

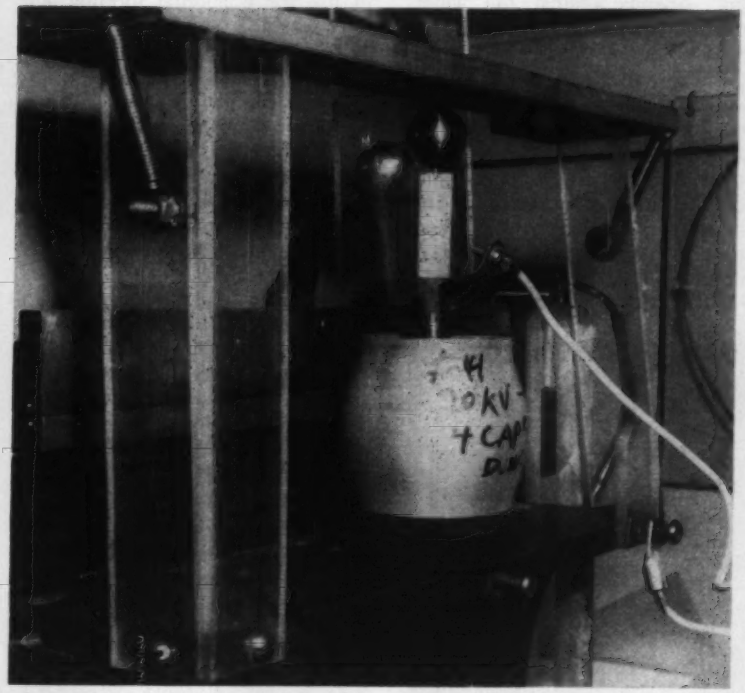
The electrical energy is stored in capacitors and suddenly triggered to create the spark across two electrodes. Other liquids have been tried, but water works as well as any.

Theorists say that the spark heats the liquid to produce a gas which expands rapidly. The high pressure produced is almost entirely transmitted to the resulting shock wave.

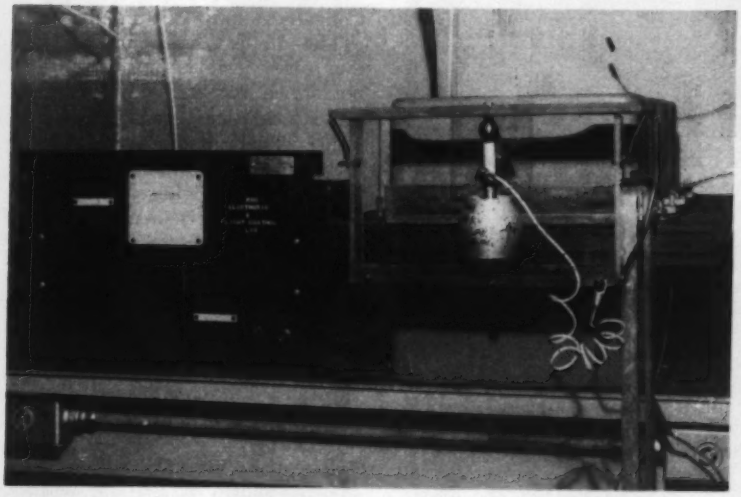
• Hydrospark, like explosive forming, lends itself to the expansion and sizing of hollow bodies.

"Those are the most economical uses," says E. W. Feddersen, chief of manufacturing at Convair Div., Ft. Worth, Tex., General Dynamics Corp. Engineers there have formed stainless, steel, copper, and aluminum parts.

Researchers at Republic Aviation Corp., Farmingdale, N. Y., point out that the process combines the good points of conventional and explosive forming.



Tube is formed. Coaxial electrode was used. Spark is set off by pulling a string which lifts Plexiglas barrier from air gap



Republic's "spark bomb" has four capacitors connected in parallel. Plastic insulator is shown between the air gap balls

It is safer to use than explosives and is suitable for in-plant processing. A high degree of accuracy and control is possible. And initial investment and operating costs are low.

In terms of economics, most practitioners feel it compares favorably with other methods of high energy forming. One firm suggests it may be cheaper.

H. J. Wagner, principal metallurgical engineer of the Alloy Development Div., Battelle Memorial Institute, Columbus, Ohio, believes the technique to be easily adaptable to automation, or that it could be used as a source of primary power to a press or other device in which power is transmitted through mechanical linkages.

Energy can be controlled to produce various effects. Example: Surface hardening in the inside of a cylinder. Battelle reports that a Russian scientist has discovered pressure zones that surround the discharged spark. Pressure diminishes rapidly as distance increases from the point of spark occurrence. Various kinds of work can be done in each pressure zone.

• Work possibilities seem limited only by the power output of the system.

A Republic Aviation engineer reports that comparative analyses of the mechanical work done and the energy of the electrical discharge have indicated efficiencies of 15 to 35 per cent.

Process limitations (such as degree of deformation, diameters, and wall thicknesses for specific materials) have not been fully established. Current work at Republic Aviation is to relate mechanical work to physical dimensions.

Mr. Wagner of Battelle declares: "We do not feel there is any more of a limitation to the type of metal articles formed by this means than by any other means. It is too early to tell whether materials not formable by other means can be formed by hydrospark.

"In our opinion, there are few physical limitations to the process if repeated impacts are applied. However, material might require annealing between impacts. For a single impact, the energy is limited for practical reasons by the voltage which can be contained and by the number of condensers that can be amassed in one area."

Engineers at the Flight Propulsion Div. of General Electric Co., Cincinnati, agree there is no theoretical limit of the work that can be done. The degree of deformation is limited by the metallurgical characteristics of the metal to be formed.

• Convair has added a new wrinkle to the technique.

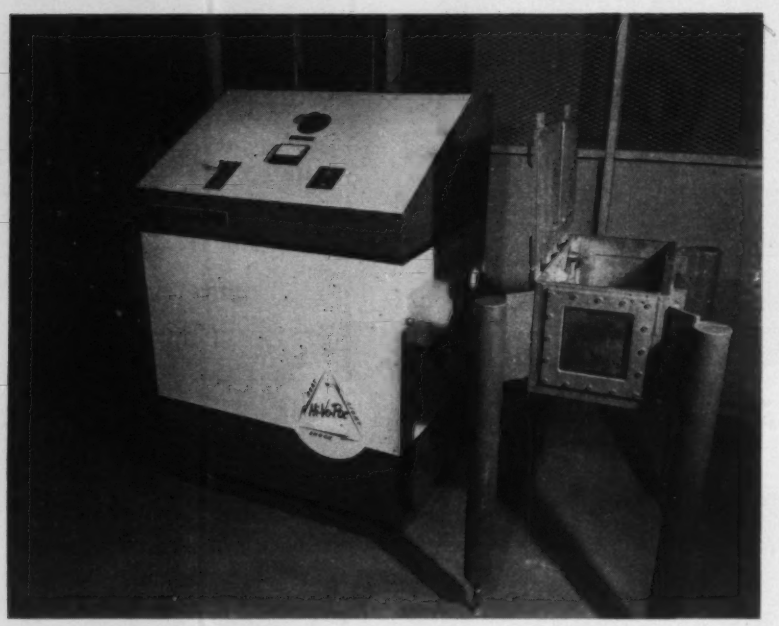
Initially, engineers used voltages of 14,000 to 22,000 and capacitances of 30 to 60 microfarads. They were able to generate shock waves sufficiently intense to form small parts. All the work was done with

a spark discharged from a bank of capacitors.

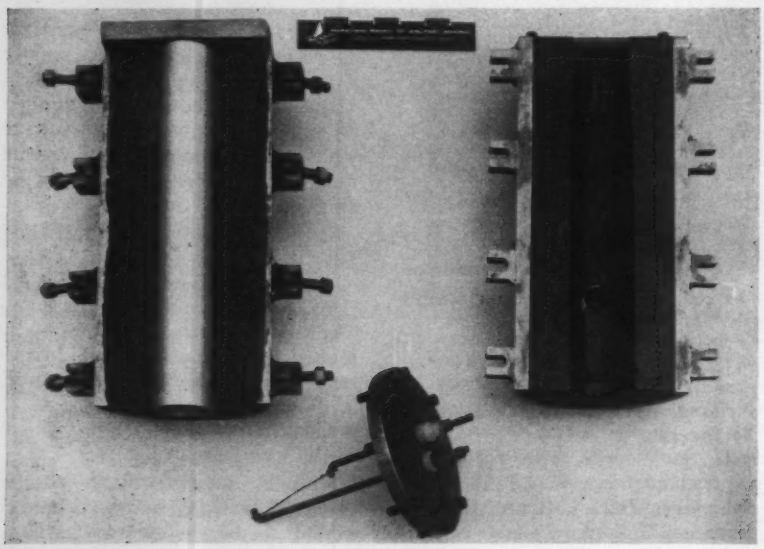
They found they could get more power by reducing the voltage to 4000, increasing capacitance to 1200 microfarads, and adding an initiating wire between the electrodes.

When the unit is fired, the initiating wire is transformed into a cylinder of metallic vapor. The vapor expands against the water causing a high pressure buildup. Mr. Feddersen says that upon vaporizing a tungsten wire will increase its original volume by more than 25,000 times.

Another interesting phenomenon was discovered; variable wave fronts could be formed by shaping the initiating wire. Sharp nosed, spherical, and planar wave fronts were observed. Each front can be put to use for a specific forming job.



Convair spark unit is housed in control cabinet. Smaller chamber to right holds part while it is being formed



Molds for forming part are split for ease of part removal. Initiating wire is suspended from cover

• The most obvious departure from explosive forming is die design. Dies are completely closed.

At Convair, the closed dies contain fixed electrodes to which the initiating wire is attached. The positioning of the electrodes (to get the most efficient wave front for the forming to be done) is determined by experiment.

Each die has its own set of electrodes and initiating wire. The dies can be completely closed because the gas volume generated by the vaporized wire is insignificant, if compared with the gas bubble created by a chemical explosive. By closing the die, full advantage can be taken of the pressure wave, and in the case of tubular parts, the shock wave can be reflected off the ends, creating additional energy.

Convair uses epoxies as die materials. The resins have high compression strength and reasonable wear characteristics. The resins are poured into various diameter shells which contain the pattern of the part to be formed.

• Here is the sequence used at Convair to form one tubular part.

The die is closed and the bottom plate installed. The tube to be formed has a rubber wafer installed at its base, making it watertight. The tube is placed in the die cavity and filled with water. The cover plate with electrodes and initiating wire is installed. The leads from the power unit are connected to the electrodes, and the release button is pressed.

In 6 seconds, the unit charges itself and fires automatically. In simultaneous actions, the tube is expanded; beads are formed near the ends; and a hole is pierced.

• The most interest in the process is being shown by airframe, missile, and engine accessory fabricators.

Those industries generally deal in relatively small quantities of parts. Their configuration is changed frequently because designs are revised frequently.

The controlled and repeatable electrical explosive force appears to be a powerful method for forming metals. It has certain inherent advantages, such as simplicity, which may make it an economically feasible metalworking technique.

How Vacuum Melting Stacks Up

There has been a lot of talk about the differences between vacuum and air melted steels and alloys. Scientists at Battelle have surveyed the published reports. They sum up the results in this article

VACUUM MELTING of steels and superalloys is here to stay. Arguments used by researchers to convince company treasurers to lay out capital dollars are pretty hard to refute.

The arguments: Generally, physical properties are improved, including greater ductility, higher tensile strengths, better fatigue life, and lower transition temperatures. Also, vacuum may be the only practical way to melt the product.

But equally careful consideration has closed company purse strings. The equipment isn't cheap, running up depreciation costs; processing is likely to be slower, adding to expenses; and demand for the product can be another unknown. Equating cost to value is a tough problem.

The big push has come from aircraft and missile work; designers welcomed the improved metals. For other applications, the growth has been slower but encouraging to producers. No one, it seems, will predict that the process will ever be relegated to the laboratory.

• The advantages of vacuum processing depend on the metal; they are not uniform for all materials, or all processes.

After a thorough study of information on vacuum pouring and vacuum melting, D. C. Ludwigson and F. R. Morral of Battelle Memorial Institute, Columbus, Ohio, conclude that:

• Vacuum pouring reduces hydrogen in low alloy steels, improving ductility.

• Low alloy and chromium hot work die steels which are arc or induction melted in vacuum show better fatigue, impact, ductility, and directional properties but seldom higher tensiles.

• Ferritic and martensitic stainless steels gain improved transition temperature, rupture strength, and elongation from vacuum induction melting.

• Vacuum induction melted nickel-based superalloys show better stress rupture, fatigue, and tensile properties. (Some credit was given to modifications and more uniform composition made possible by the process.)

• Vacuum induction melted, cobalt based superalloys exhibit improved rupture ductility. There is little change in tensile and rupture strengths.

• Iron base superalloys and hardenable stainless steels which are consumable electrode vacuum arc remelted show improved tensile strength, ductility, fatigue strength, and stress-rupture properties.

It is not possible to conclude that vacuum treating will help all metals; results depend on the material and care used in the melting practice. In one instance, no improvement was noted when comparing an aircraft quality, hot work die steel with the same analysis that was vacuum induction melted—but the aircraft quality material is unusually low in inclusions.

• You can expect that vacuum methods will reduce inclusions, cut gas content.

Bearings made from SAE 52100 were compared, using vacuum induction and conventional air melting practice. A sharp reduction in early bearing failures was coupled with a longer endurance life for the vacuum melted materials. Fatigue and impact properties were higher, but the longer service life was attributed to the reduction of inclusions.

Vacuum pouring was a help in making ingots for heavy forgings because it reduced gas content, and inclusions were smaller. In a nickel-molybdenum-vanadium steel, which is sensitive to hydrogen embrittlement, vacuum pouring produced marked improvement in elongation and reduction of area figures. Aging the conventionally cast metal upped its values, but they were still substantially lower than those of the vacuum processed material.

Rocket and missile cases are subjected to high stresses, and weight problems require minimum thickness. At Aerojet-General Corp., tests were made with a number of low alloy steels for motor cases. Hydrostatic bulge tests were compared, and the vacuum melted materials stood out markedly superior; welded areas, in particular, benefited from vacuum melting.

• Use of vacuum processes does not guarantee an across the board improvement in properties, nor are all methods comparable.

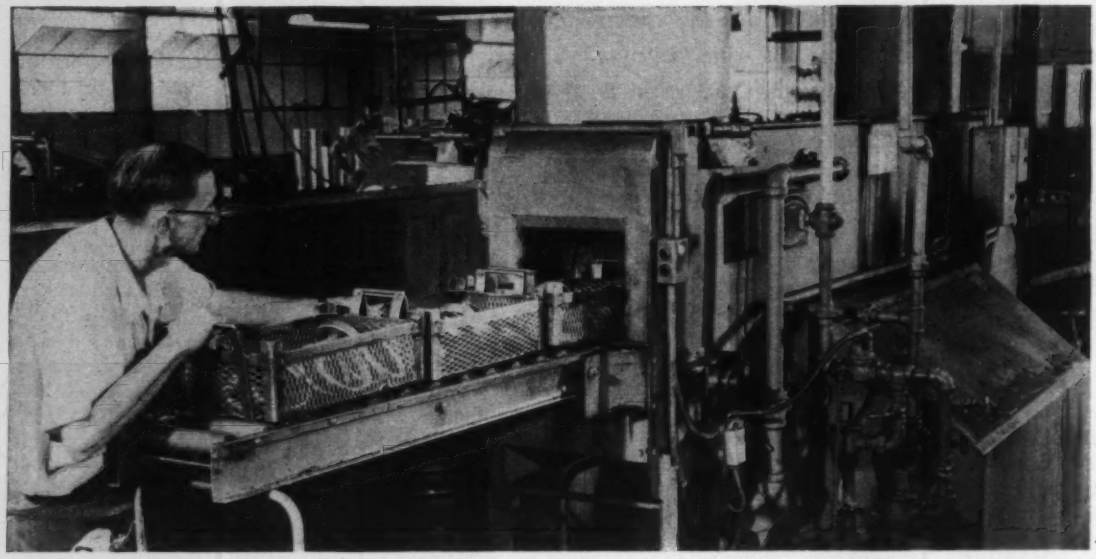
The results on H-11 show that aircraft quality is already pretty high. It may be necessary to go to relatively large heats of vacuum melted alloy if there is to be a marked improvement. Tests on Haynes Stellite 151 also showed approximately the same rupture strengths for air and vacuum induction melting methods.

In checking with producers, the Battelle scientists found that the H-11 type steel, when melted in vacuum using the consumable electrode process, had sharply higher elongation and reduction of area values.

"Several examples," say Messrs. Ludwigson and Morral, "are available to show that improved properties do not accrue automatically through vacuum melting but only through careful vacuum melting practice."

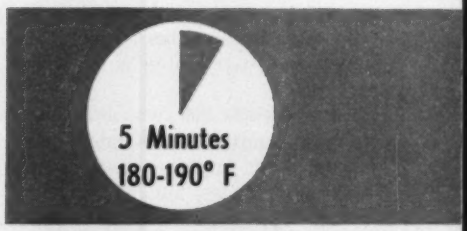
But users who can benefit from lower gas and inclusion content will have an increasing number of alloys to choose from in commercial quantities.

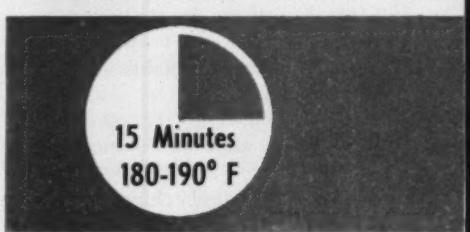
Two Alkaline Cleaners Can Handle Most Jobs



How Composition Affects Action of Alkaline Cleaners

Fluorescent oil film photographed under ultraviolet light





SOIL REMOVAL under controlled conditions is shown by these photographs of polished steel plates. They were soiled with SAE 50 engine oil and cleaned as indicated. Under ultraviolet light, the oil fluoresces; white areas on the panels show oil remaining, so the darker the panel, the more effective the cleaning. At a constant temperature, the pictures show the effect of high and low alkalinity, the use of surface active agents, and time of immersion. The surfactants are the key to effective use of low alkalinity cleaners

The tendency has been to design a new cleaner for each new job, resulting in a multitude of slightly different formulations. One is proposed for still tanks, one for power washers

TWO ALKALINE formulations that are mild by usual designations can handle 90 per cent of the cleaning due in metalworking reports Paul Welsh, assistant manager of research, E. F. Houghton & Co., Philadelphia.

Applying the concept can reduce inventories and storage space, simplify equipment used in cleaning.

Principle involved: Use of surface active agents to bolster the efficiency of the cleaner reduces the need for high alkalinity; this permits the same material to be used for aluminum (attacked by caustic solutions) and for steel (which the strong alkalies do not harm).

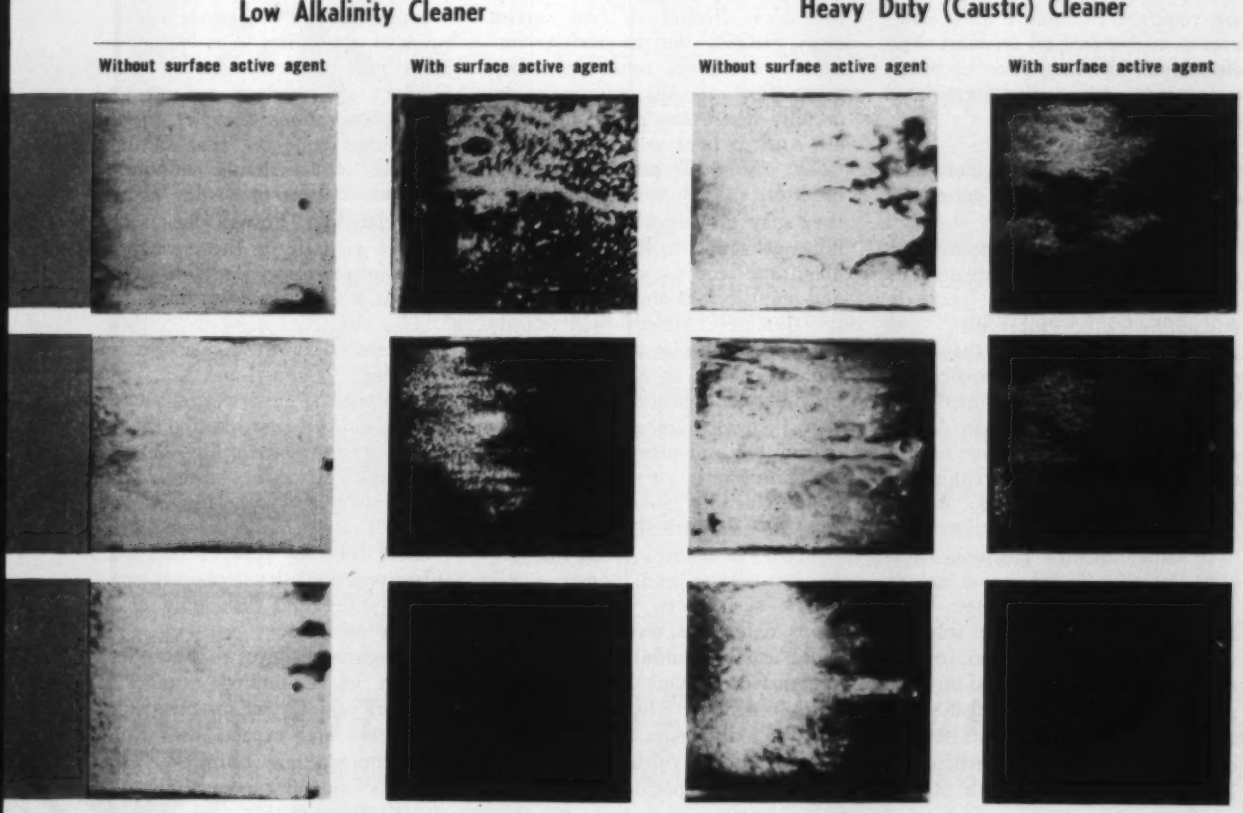
• The designations usually are based on the relative alkalinity of the cleaners; "heavy duty" cleaners have been the most alkaline.

It has been assumed that the more alkaline the solution, the more effective the cleaning. Probably that was true in the early use of cleaners—the fats and oils to be removed were animal or vegetable in origin, and the reaction with highly alkaline cleaners caused the formation of soaps which aided in soil removal. (The conditions accounts for the observation in some plants that new batches of cleaners did not work as well as older ones.)

Highly alkaline cleaners were specified for the removal of heavy, tenacious soils. Examples: Drawing compounds, forging lubricants. They contained strong alkalies such as caustic soda. When used with aluminum, the caustic would cause etching; parts could be damaged, sometimes even with a short immersion.

Tests on various soils revealed that many of the heavier ones are removed efficiently from any metal by milder, less alkaline solutions; frequently, the milder solutions were more effective than strong alkalies.

Then the removal of each kind of dirt from an aluminum support was studied in the laboratory. Object: To remove dirt rapidly and effectively, without attacking the surface. Houghton reports that if the soil can be removed from aluminum, the same cleaner will be just as effective for steel and other



A good cleaning formulation Should:

Wet the surface.
Penetrate the layers of solid soil.
Emulsify, deflocculate, and reject oils and greases.
Rinse freely.
Not corrode parts or equipment.
Prevent resoiling.
Have good service life.

metals; if it is only mildly alkaline, it is ordinarily safe to use.

• There will still be a place for special purpose cleaners, Houghton believes. They will be needed for about 10 per cent of cleaning jobs.

While the development approach has resulted in cleaners which are of wide utility, specialized products are required to remove such coatings as carbonized oil or paint. And electrolytic cleaning prior to painting needs differently formulated types.

• The basic difficulty in most metalworking plants: The variety of soils encountered.

Most prevalent problems are with oils and greases. They are used in cutting and grinding coolants, quenching oils, lubricants, and drawing compounds. If they were clean, they might be beneficial in a few cases: They can function as rust preventives. But Mr. Welsh points out that they are usually contaminated with metal chips, pigments, abrasive powders, buffing compounds, or plain dirt.

In usual alkaline cleaning (nonelectrolytic), oil and grease are removed as in washing dishes: Work is soaked in a cleaning solution, with or without agitation, or the solution is pressure sprayed onto the parts. The soil is emulsified by the cleaning chemicals, if it is an oil or grease, and solid particles are held in suspension. With oil and grease removed, other solids are not held so firmly to the surface; if they do not come off in the washing operation, they may be rinsed away.

• Alkaline cleaners now used, Mr. Welsh reports, contain three essential ingredients: Water, builders, and surfactants.

The water carries the cleaner to the work, flushes it, and carries away the soil. So water characteristics are always important; they may affect cleaner efficiency, especially where low priced materials are tried in hard water areas.

The "builders" provide the alkalinity for the solution. In addition, they may provide a buffering (stabilizing) action to hold the desired alkalinity, act as water softeners, and emulsify oils and greases. Highly alkaline builders will slowly saponify some oils and fats. Other builders, such as the phosphates, provide some sequestering action; they hold calcium and magnesium in solution and prevent their forming precipitates or curdy material in the cleaning tanks. Most builders are alkaline inorganic compounds of sodium, such as carbonate, silicate, and others.

The surfactants, which may be soaps, detergents, wetting agents, or more usually combinations, change the surface tension of the solution. They provide the functions of wetting, soil dispersion, some emulsification, ease of rinsing, and reduction of soil redeposition. They may be foaming or nonfoaming, and range from soaps to polyoxyethylene esters.

The wide range of materials which can be used in combination gives the cleaner chemist an opportunity to design a good combination for any special problem. So producers such as Houghton have come up with a long line of specialized cleaners. But in today's wide range of metalworking, many different cleaners often must be stocked.

• Result of the test program has been the preparation of two general purpose cleaners.

For hot soak tank cleaning, Houghton recommends a product which includes mild alkalies such as metasilicates and pyrophosphates, along with nonionic and anionic synthetic detergents. It contains no free caustic, is nontoxic and does not dust, says Mr. Welsh. It is adjusted for the job. A concentration of 4 ounces per gallon serves for general purpose work; heavy soils may require up to 8 ounces per gallon, while for lightly soiled parts 2 ounces may suffice.

The cleaner is not suitable for power washing equipment, where foaming must be held to a minimum if the spray is to strike the work with maximum force. Power washers also include rinsing and drying operations as part of the continuous unit, so that cleaners for such service should contain an inhibitor to prevent rusting shortly after cleaning. Power washers also depend partially on the mechanical action of the spray, so cleaners are used at a lower concentration.

The cleaner developed for heated high pressure washer systems has low foaming and alkalinity characteristics, good wetting action, and contains a rust inhibitor. It is designed for temperatures between 150 and 180° F in concentrations between ½ and 2 ounces per gallon.

Low foaming permits maximum effectiveness of the impinging spray for cleaning and dislodging of insoluble particles.

Houghton believes that standardization on a limited number of cleaners can pay off for metalworking users and expects that future developments may bring even more versatile cleaning compounds.

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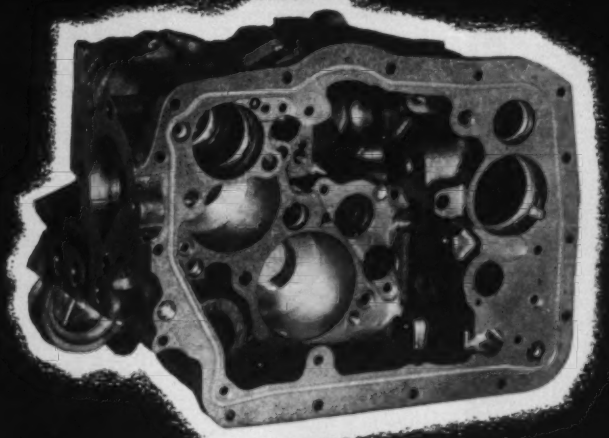

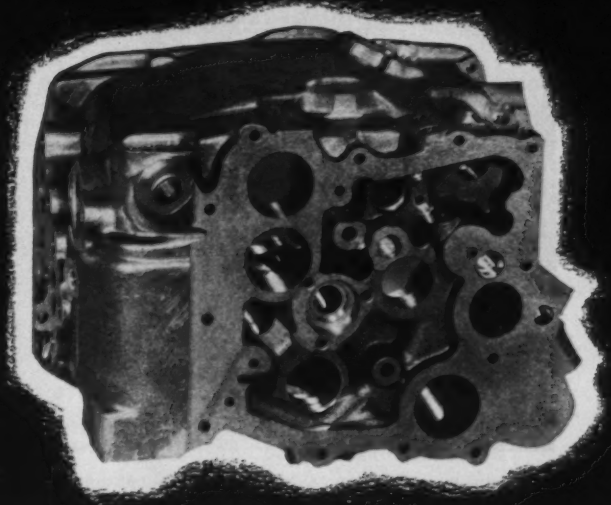

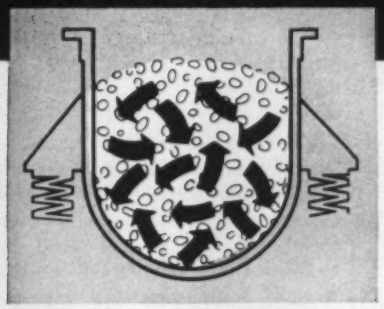

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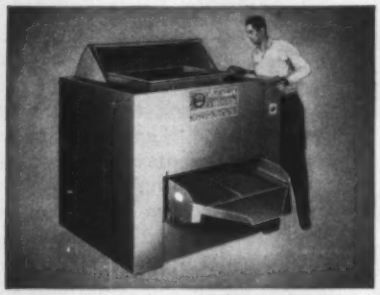

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Woodward Governor Co., Rockford, Ill., long a leading manufacturer of all types of governors for prime movers, manufacture such highly precise equipment as jet engine fuel control systems. Precise finish and dimensional tolerances are a must! The fuel control shown above was previously hand deburred and then tumbled in a multiple compartment machine for 1 hour. Now . . . these cases are processed *2 at a time in 15 minutes* in the Vibratron. Hand operation is cut by a third, and the finish is more uniform.

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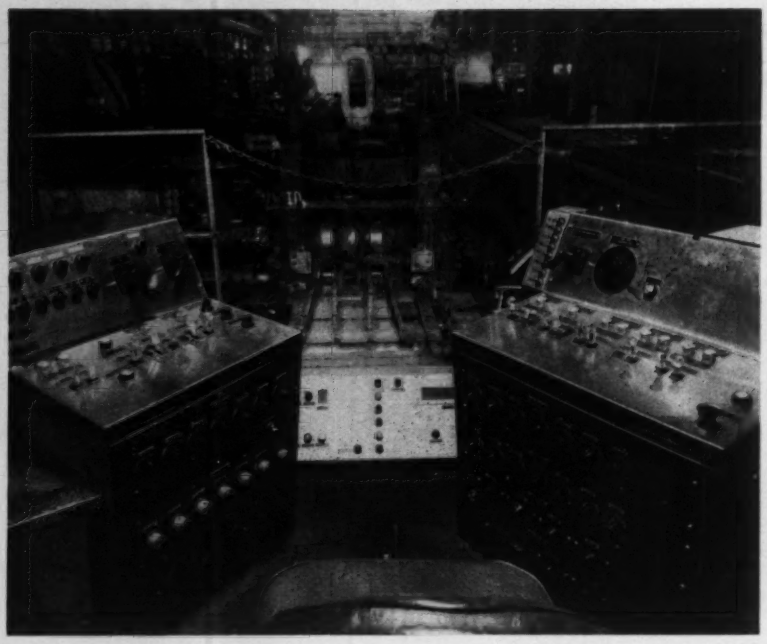


This console controls some of the complex operations of U. S. Steel's new structural mill at the South Works

Modern Drives, Controls Automate Structural Mill

Punched card controls guide blooms through mill stands; roll positioning and manipulation are automatic, and speed ratio control eliminates need for pinion stands

DRIVE and control systems integrate mechanical and electrical equipment for a mill at South Works (Chicago), United States Steel Corp. The facility can turn out a 250 ft structural every 19 seconds when operating at full speed. It is expected to increase wide flange beam capacity at the works about 40 per cent.

Development work on the drive system was done by U. S. Steel engineers at the Monroeville, Pa., research laboratory; extensive process and systems analyses were made by General Electric Co. engineers.

• Key to the high capacity is operating speed—about 1500 fpm—and precise, automatic setting of roll openings.

Pin point control of roll openings reduces scrap losses and cobbles ordinarily associated with high mill speed. That was a prime reason for the high degree of automation incorporated in the mill. No operator could make the accurate settings provided by the control system, say U. S. Steel spokesmen. On one of the stands, rolls are positioned automatically in increments as small as 0.001 in.

The system uses punched card data to direct operations in the five stand rolling complex that includes a breakdown mill, two reversing finishing stands, and two nonreversing stands. A program control system developed by General Electric uses static switching components to direct the reading of punched card data and to convert from binary to decimal code.

Preselected data, stored on punched cards and fed into the system by static logic elements, automatically control and sequence 43 operations. As many as 21 passes through the five stands can be programed by the punched card system, which directs breakdown and forming of steel blooms weighing up to 5 tons.

• The control system guides blooms into the breakdown stand, through two reversing finishing stands, and two nonreversing stands.

Structurals leaving the finishing stands are cut and transferred semiautomatically to cooling beds. From that point, the structurals — wide flange beams, I-beams, zee-bars, and other shapes—are taken through several transfer table operations, a straightener, and onto an inspection bed, where they are turned over by a notched wheel for visual examination.

The members are then cut to final length and transferred to a piler area, from which they are removed by an interworks train to fill orders. Hoist and trolley motions of two to four cranes can be synchronized to load large pieces on the cars.

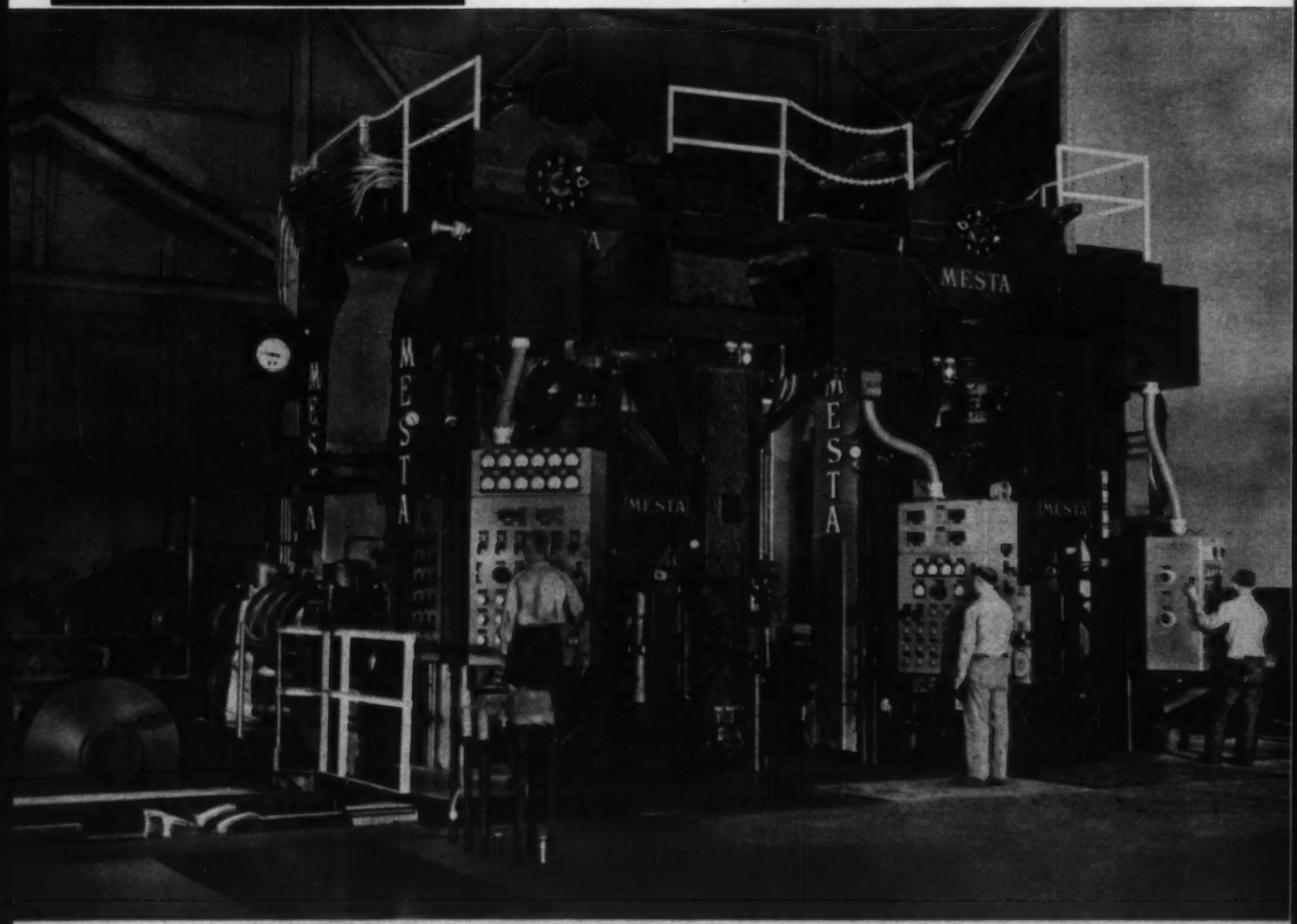
• Other mill features: Automatic manipulation, manual takeover for each programed function, and programed speed unbalance.

Speed unbalance, or speed-ratio control, is provided at the breakdown mill and on the main drive at the first stand. The control system maintains the desired speed relationship between independent drives on top and bottom rolls, eliminates pinion stands.

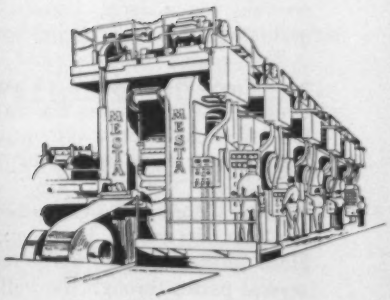
Adjustment of speed ratio to compensate for turnup or turndown of the ends of workpieces gives the roll designer more latitude and reduces the grinding required on many structural shape rolls.

Card programing of side guides and fingers at the breakdown mill permits completely automatic manipulation (90 and 180 degree turns) and alignment of incoming blooms.

MESTA COLD MILLS



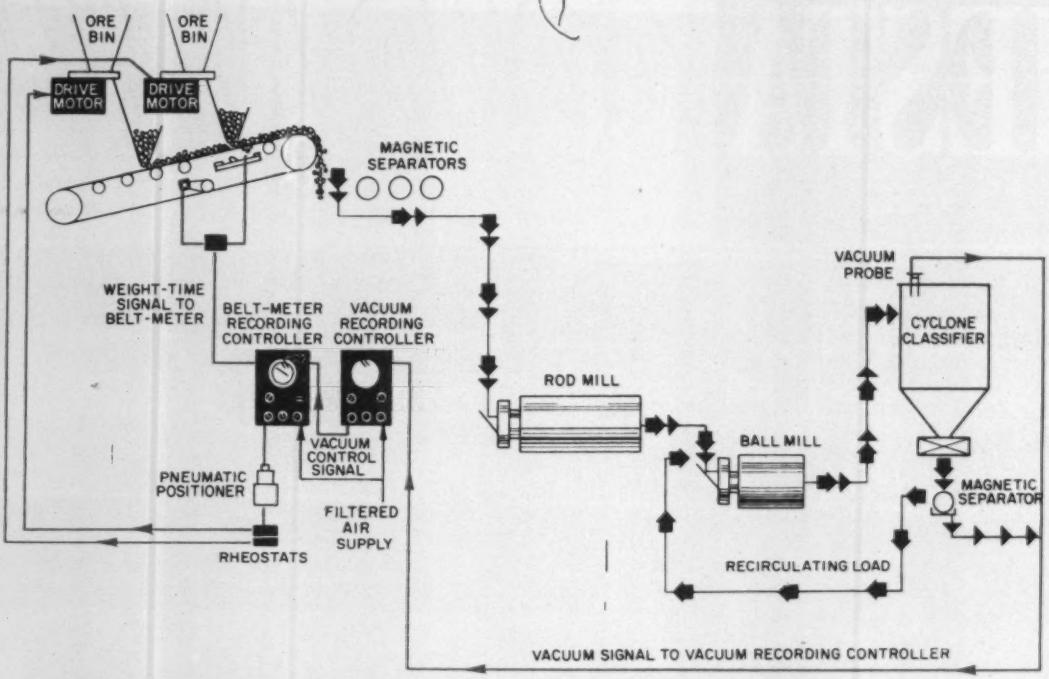
MESTA 51" Two-Stand Tandem Temper Mill Operating at the Yorkville Works of Wheeling Steel Corporation.



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



Stylized schematic drawing depicts hard and soft ores being processed. Harder ores are shown being recirculated. Color lines denote instrumentation regulating ore feed

Automatic Controls Keep Ore Mill Capacity at Peak

They regulate ore fed to grinders, measure the rate of feed, and record output. Adjustments are made automatically when several passes are required

AN AUTOMATIC grinding control system that processes iron concentrates and pyrites is making it possible for a large Eastern iron mine to maintain peak production.

The system designed and built by Trans-Weigh Co., King of Prussia, Pa., regulates the rate of flow of crushed ores and measures and records plant output (in tons).

• **Input Monitored**—Ore size and hardness determine load capacity. Hard ores, for example, require several passes through the ball mill before they are reduced to proper screen size. The added load increases the vacuum in the cyclone classifier. Probes in the classifier sense the increase and send signals to a vacuum recording controller and Belt-Meter (the meter measures ore fed to the grinder). Pneumatic impulses from the meter regulate a rheostat which decreases voltage output, reducing the table feeder drive.

Corrections in feed continue to reflect fluctuations in size and hardness. Feed to the rod mill is regulated, and the ball mill is kept at optimum load with uniform horsepower requirements.

• **Rate of Feed Measured** — A weighing carriage, mounted to the conveyor belt, measures the crushed ores supplied from the bin to the grinding line. Ore weight is measured by a resistance load cell; belt speed is measured by a tachometer generator driven by the returning conveyor belt. The load is shown on a Belt-Meter recording controller in tons per hour.

• **Output Recorded**—The identical instruments measure and record mine-plant output. A potentiometer (Belt-Meter) indicates instantaneous flow, and a dial type indicator provides total tonnage. A tape printer notes every ton delivered, and it can be used to record accumulated tonnage going to each ore car. Each printer is equipped to provide fractional car tonnage. Cars can then be evenly loaded, and the exact tonnage per car can be determined from the printed record.

New DoALL Heavy-Duty Contour Machines Make Hand Sawing More Accurate, 100% Faster

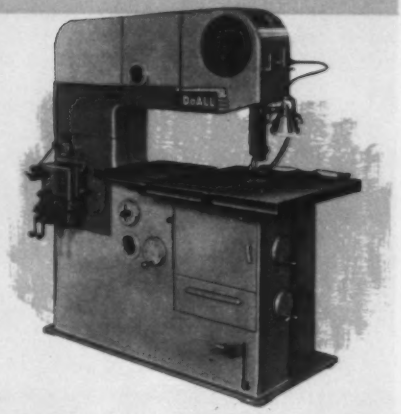
Now, for the first time, DoALL enables you to use H.S.S. bands on a fixed-table, manually fed band machine. You can speed your internal and external sawing, as well as machine filing and polishing . . . make 3-way savings. All these benefits are yours with the new, inexpensive type 2 DoALL Contour Machines:

FASTER CUTTING RATES. With Demon® high-speed steel saw bands you increase cutting rates 100%. These machines have all-welded, steel, box-frame construction to withstand the high tension needed on H.S.S. bands for high-speed cutting.

LARGER COOLANT SYSTEM. New large-volume coolant system with mist applicator gives high efficiency, prevents chip welding.

EXTRA-HEAVY-DUTY WELDER. You can weld H.S.S. saw bands up to ½ in. wide—right at the saw—with the new DoALL DBW-8 welder, now standard equipment on these machines. Its large capacity permits welding 1-in. carbon blades.

DoALL type 2 Contour Machines are built in four sizes with four throat depths of 16, 26, 36 and 60 in. Investigate these money-saving machines. Call your nearby DoALL store for demonstration or write for free bulletin.



The new DoALL type 2 Contour Machines are ideal for toolroom use. Built with sturdy, all-welded, box-frame construction, they are equipped with an efficient mist coolant system and a new heavy-duty welder.

During the Machine Tool Exposition, see DoALL's Demonstrations at the Coliseum, Navy Pier, Hall of Progress.

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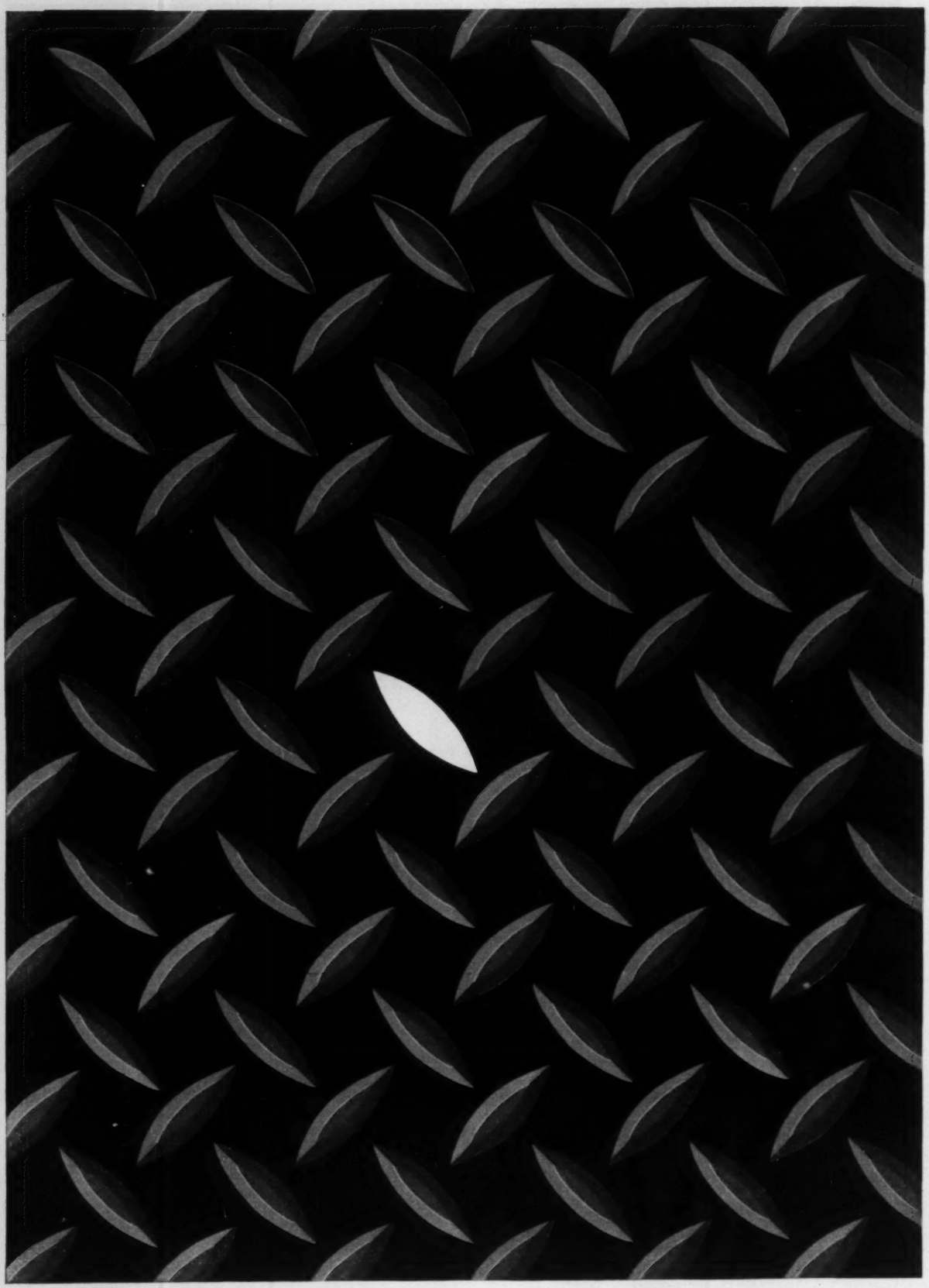

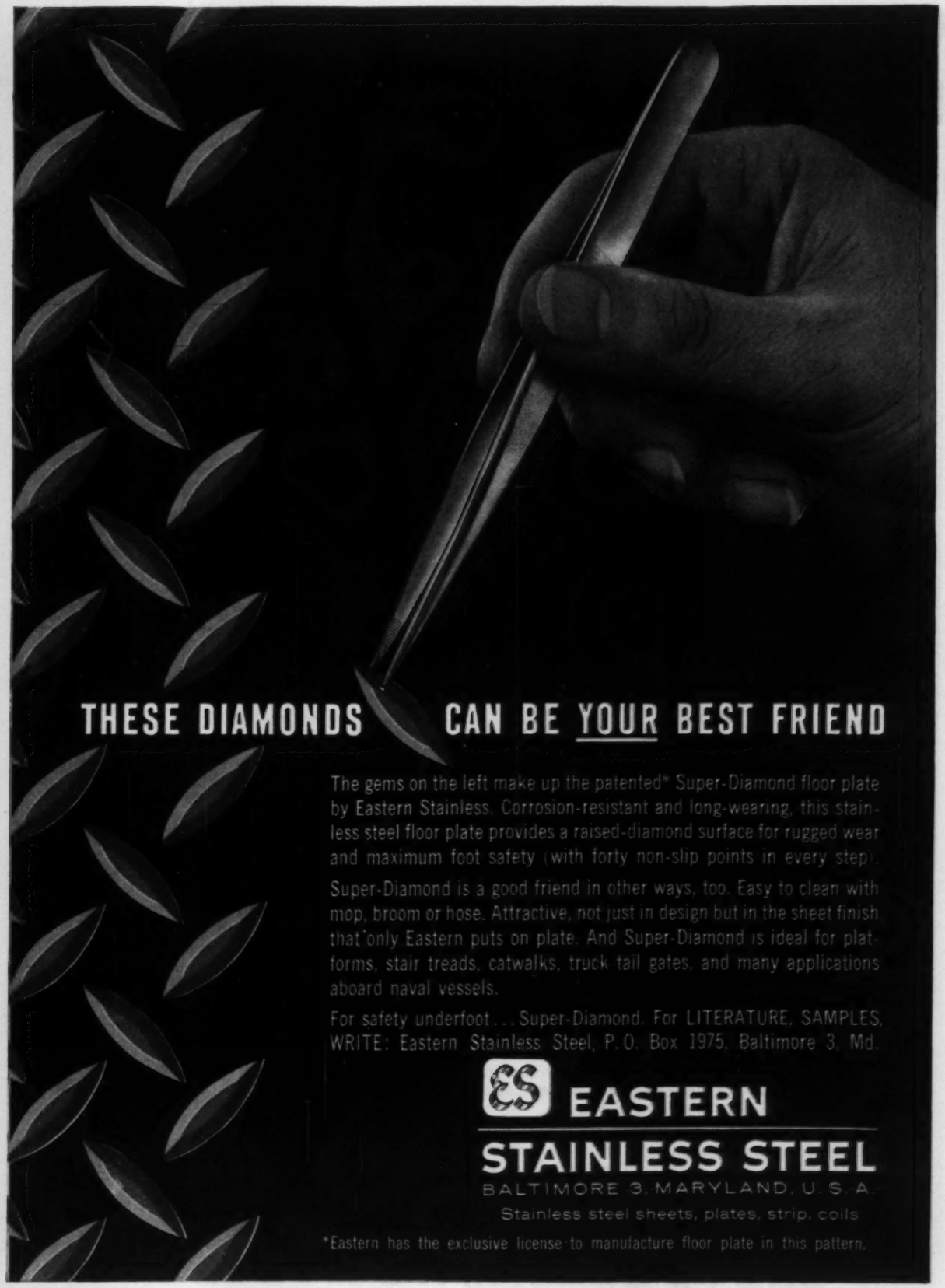

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The gems on the left make up the patented* Super-Diamond floor plate by Eastern Stainless. Corrosion-resistant and long-wearing, this stainless steel floor plate provides a raised-diamond surface for rugged wear and maximum foot safety (with forty non-slip points in every step).

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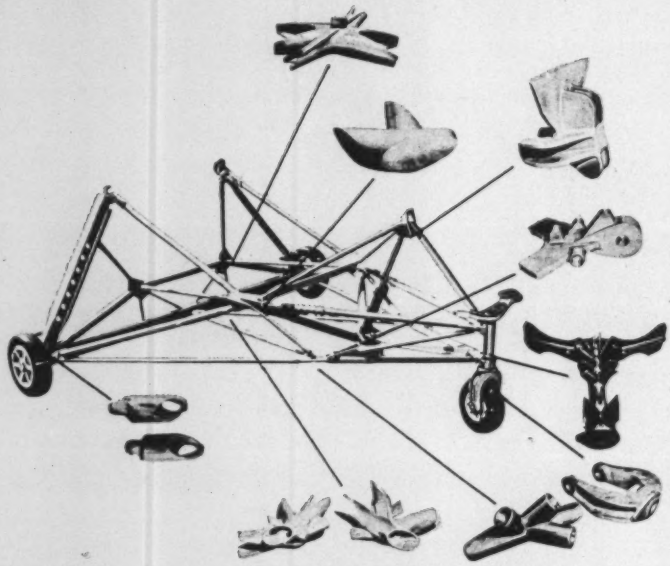
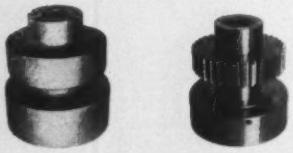
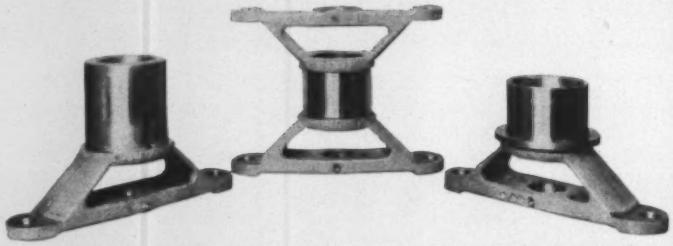
Castings Cut Inventories, Reduce Machining Costs



Redesigned missile cart uses 20 castings instead of 73 detail parts



Shaped casting (left) saves machining in making clutch housing (right)



Three parts for a rope making machine are made with identical castings

LOWER INVENTORIES of parts and hardware items, reduced machining costs, and less complicated assembly are some of the benefits available to users of steel castings, says the Steel Founders' Society of America, Cleveland.

Fabricators documented product improvement and reduced production costs through the use of castings in the Society's annual product development competition.

• A missile launching cart, redesigned for steel castings, takes less than half as many parts as the original design.

An expendable cart was needed by the Navy to catapult the Regulus I missile, made by Chance Vought Aircraft Inc., Dallas, and to handle the missile aboard aircraft carriers. Carts were fabricated and tested, but production costs had to be reduced for the number of units required by the Navy Department.

The cart was redesigned to use 20 steel cast cluster joints instead of 73 detail parts used on experimental units.

The castings were turned out by Hica Inc., Shreveport, La., and Ross-Meehan Foundries, Chattanooga, Tenn.

The joints were designed to require a minimum of machining. No machining was required for the sockets into which steel tubing was inserted and welded. And sockets were designed to take square cut, round tubing.

Construction of the cart with castings and tubing permitted the elimination of 300 hardware items, such as bolts and nuts; it also simplified assembly.

• Use of steel castings reduced machining on a gear and clutch housing for coil feeding equipment.

Castings made roughly in the shape of the finished part permitted F. J. Littell Machine Co., Chicago, to save $14.60 in material and $8 in labor on each part produced. The castings are supplied by Pelton Steel Castings Co., Milwaukee.

Previously, a straight sided cylinder of steel was used to make the part, which is for equipment that feeds coil stock to presses or shears. Rough machining wasted time and material.

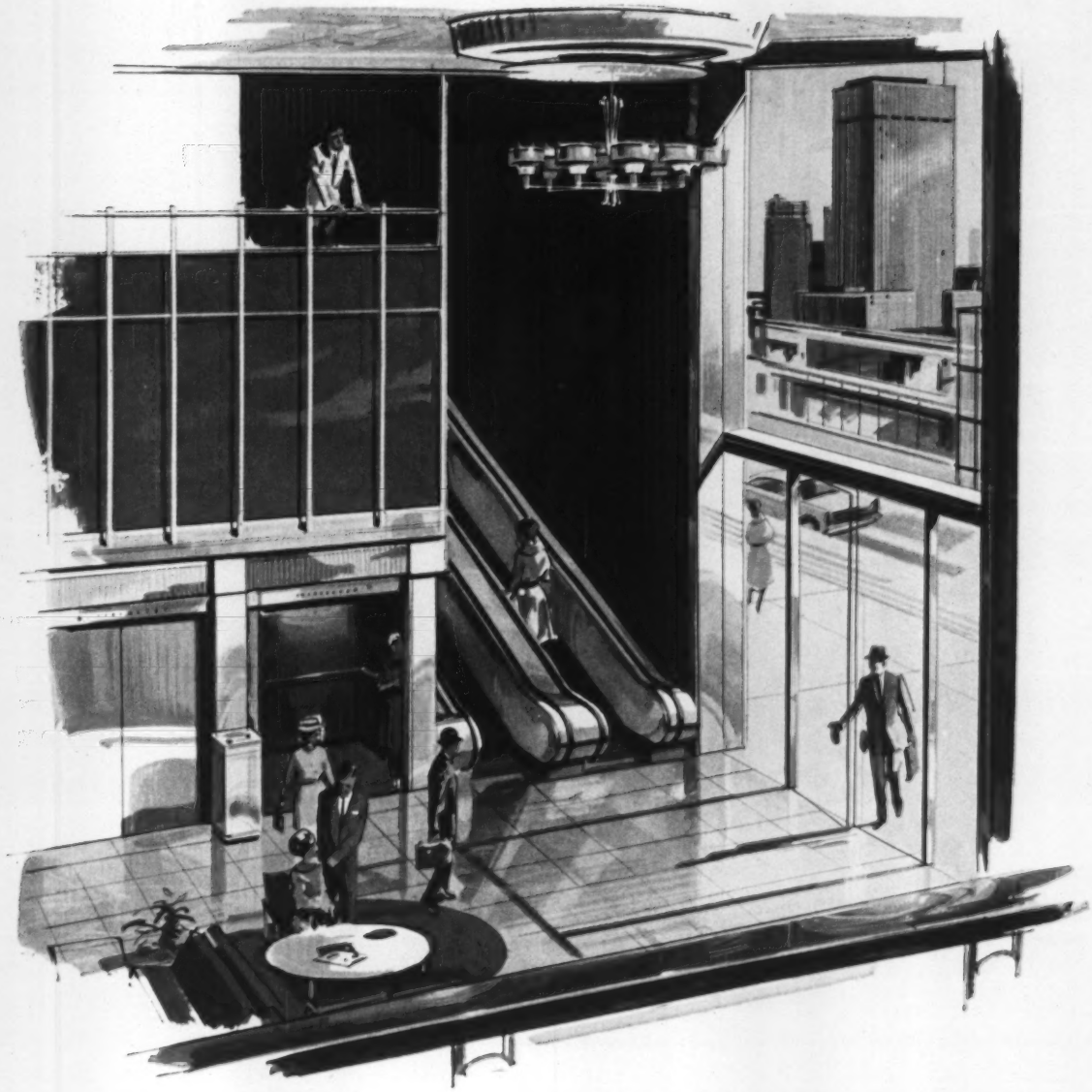
• More flexible design for rope machine parts was made possible with casting and tubing construction.

In rope making machines, flyer heads support strand bobbins, which revolve at 600 rpm. Machines made by Haskell-Dawes Machine Co. Inc., Philadelphia, use three types of heads. All are composite weldments, made of castings and tubing. The same casting, supplied by Crucible Steel Casting Co., Lansdowne, Pa., is used in all three heads.

The method requires less machining, makes for lighter parts, and is said to have eliminated rejects, which ran as high as 60 per cent when one casting was used for the entire part.

High tensile strength of steel is said to permit higher machine speeds.

Stocking of castings and of tubing in standard sizes reduces inventories. And more flexible design insures faster delivery of the parts.



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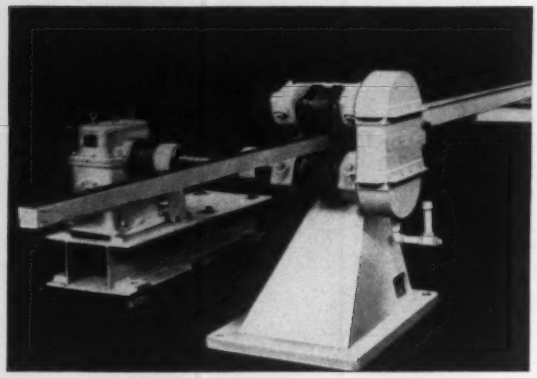
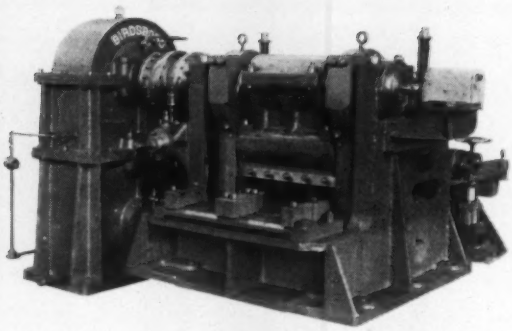
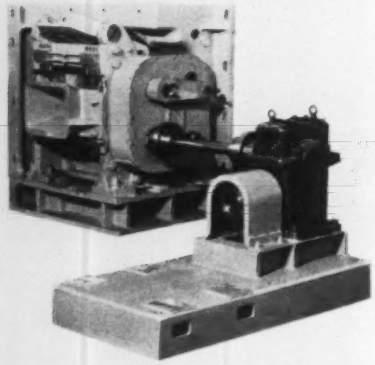


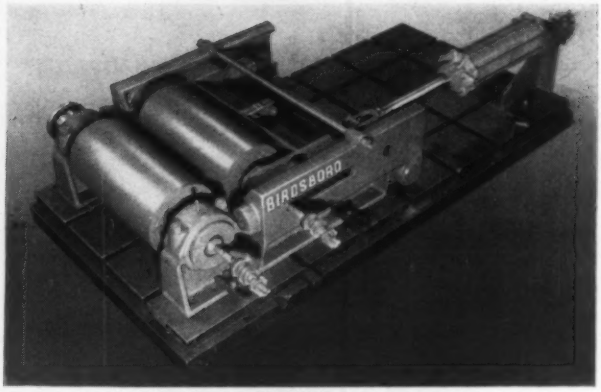
Swing type billet ejector for ejecting billets from a side discharge furnace.



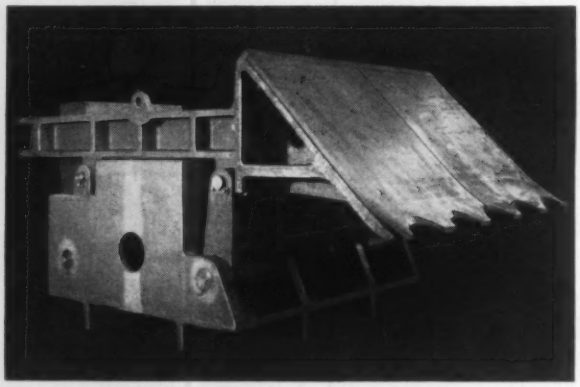
Furnace dividing shear with pinch rolls and switch for double strand mill operation.



Spring loaded discharge pinch rolls for pulling billets from furnace.

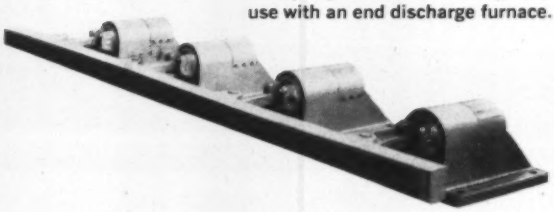


Pneumatic loaded discharge pinch rolls for pulling billets from furnace.



Heavy billet chute type spring loaded bumper for use with an end discharge furnace. The design will permit the bumper to swing clear of the table for easy table maintenance.

Spring loaded billet bumper for use with an end discharge furnace.



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Chemical Coatings Cut Metal Fatigue

Compounds protect metals from environmental elements which cause corrosion

EXPERIMENTS conducted at the National Bureau of Standards show that certain types of polar organic compounds increase the fatigue resistance of steel, magnesium, and copper-beryllium alloys.

The compounds, when applied on the metal's surface, form tightly packed monolayers which cling to the metal's surface, excluding water and oxygen molecules.

Cylindrical specimens of six different alloys were tested to fracture under one of the following conditions: Cleaned and dry; coated with and immersed in an organic substance; immersed in water, either in the coated or uncoated condition.

The water and nonpolar liquids either had no significant effect or caused a decrease in the fatigue life of the specimens. The organic compounds, however, caused an increase of more than 600 per cent in the fatigue life of the magnesium alloy, stressed at 12,500 psi; an increase of about 250 per cent in the copper-beryllium alloy, stressed at 50,000 psi; and an increase of about 200 per cent in the steel alloy, stressed at 100,000 psi. The compounds had little, if any, beneficial effect on three other metals—titanium, aluminum, stainless steel—probably, surmises the bureau, because of the strongly adherent oxide films that form on those materials.

The results showed no appreciable difference between the specimens that were immersed in the polar substances and those that were merely coated with them. Coating the specimens with one of the substances, dodecyl alcohol, and testing in a tap water environment resulted in as much improvement as had been obtained with specimens tested in air.

Other polar organic substances employed: Octyl alcohol; dodecylamine; octadecylamine.

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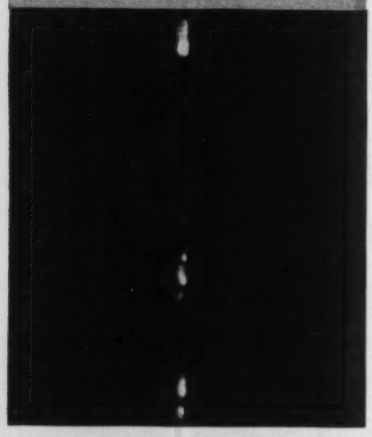
More Jobs Sought For Fluoroscopy

Pointing at the output end of an image amplifier, Walter R. Hampe says he feels the unit adds a new range of jobs for fluoroscopy



With a standard fluoroscope, the operator can detect flaws (light spots) in a weld on a 3 in. piece of steel plate. At bottom, the same weld is shown on a Fluorex image amplifier

Eastern steel mill is using technique to check welded seams in pipe. Other applications include: Checking honeycomb panels and the wiring and assembly of artillery shells and fuses

ARMED with a glass box and a long list of proved applications, a team of nondestructive testing experts is looking for more places to put fluoroscopy to work in industry.

The team has its home base at Westinghouse's Industrial Electronics Dept., X-Ray & Industrial Electronics Div., Baltimore.

The glass box is an intricate electronic tube that turns vague images into sharp pictures.

• Unlike x-ray, fluoroscopy projects its image on a TV-like screen, giving the operator a "live" picture of a still or moving object.

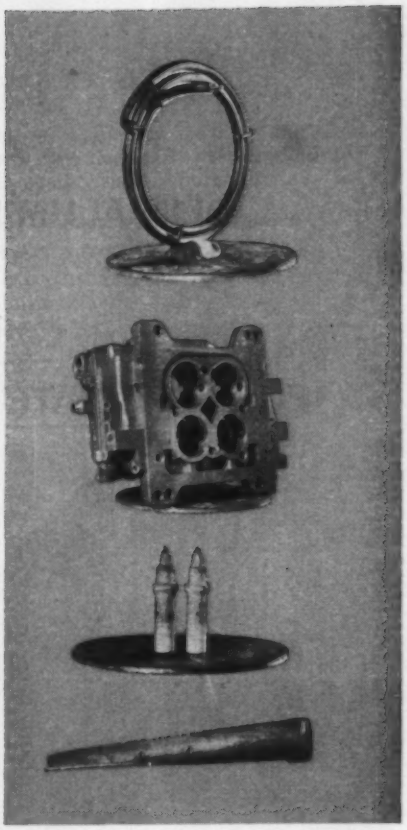
That feature makes the process more adaptable than x-ray to high production speeds, and it promises lower inspection costs per part, says Westinghouse. It also means that parts can be rotated or swung in front of the camera, picking up flaws that might be missed in a single view, x-ray photo.

Although the image on a fluoroscope screen can be photographed, normal inspection procedure does not furnish a permanent photo record.

• A wide variety of metalworking jobs are targets for fluoroscopy.

A major Eastern steel mill uses a fluoroscope to check welded seams in pipe. The pipe runs past the instrument at 10 to 20 ft a minute, depending on wall thickness. So

Four Applications



Heater Coils . . .

Mounted on rotating table, are checked for the position of the enclosed element with respect to walls, for the absence of insulation, and for possible breaks in the element

Aluminum Castings . . .

Are checked for inclusions, porosity, or shrinkage. Castings 6 in. thick can be inspected with the image amplifier

Sparkplugs . . .

Are fluoroscoped to reveal the absence of braze between the contact point and the central structure

Turbine Blades . . .

With a Stellite strip brazed on, can be inspected with the aid of an image amplifier to determine if amount of brazing meets specifications

the entire weld seam is checked (x-ray used to check only the ends of the weld).

A manufacturer of honeycomb panels will use a fluoroscope to scan complete panel sections to find crushed core cells, inadequate bond, and other flaws.

The technique is also being used to peer inside parts like artillery shells and fuses to make sure characteristics and assembly of intricate components are in order. Aluminum castings, cable and wiring, and a variety of aluminum welds and brazed joints are also being checked with fluoroscopes.

In addition to those jobs, Walter R. Hampe, advisory testing application engineer, says a host more have been proved experimentally and are being investigated by potential users. They include the inspection of aircraft sparkplugs, grinding wheels, inserts in plastics, Stellite stripped steam turbine blades, and inclusions in many metals, including beryllium.

Metal flaws that can be detected include linear discontinuities, shrinkage, inclusions, and porosity. Mr. Hampe says fluoroscopy is particularly successful in locating linear discontinuities although they are nearly invisible from one direction. The rotating part gives the camera many chances to spot the trouble. Shrinkage, he says, can be seen readily if it is a cavity or sponge type. Microshrinkage is difficult to see, although experienced observers can often detect it.

Inclusions can also be spotted with little difficulty. Small porosities can be a problem since they may provide no sharp edge that would catch the inspector's eye.

• Initial investment may be larger than that for radiographic equipment, but operating costs will probably be lower. Fluoroscopy is generally used where x-ray does not do a satisfactory job costwise.

Fluoroscopy lets the inspector spend fewer minutes on each piece than with x-ray, and it involves little or no film or processing time and expense. Operating cost, says Mr. Hampe, runs 3:1 to 8:1 in favor of fluoroscopic equipment.

First cost of an installation will be run up by special equipment for difficult jobs. The image amplifier or television projection equipment, for example, adds to the cost. Mr. Hampe warns, however, that if the total investment is related to the number of pieces inspected, and is compared with costs of other inspection methods, fluoroscopy often comes out ahead.

• Fluoroscopic units should be specially adapted to the job.

Mr. Hampe says the unit should be designed to meet all conditions of inspection, and it rarely can be done with an off-the-shelf system. Protective cabinets and work handling techniques are designed around the parts to be checked.

Special attention ought to be given to protection at the parts entrance so workers are not subjected to radiation as the part enters the radiation area. Work can be held on rotating tables or other positioning devices, or it can pass the camera on belt conveyors.

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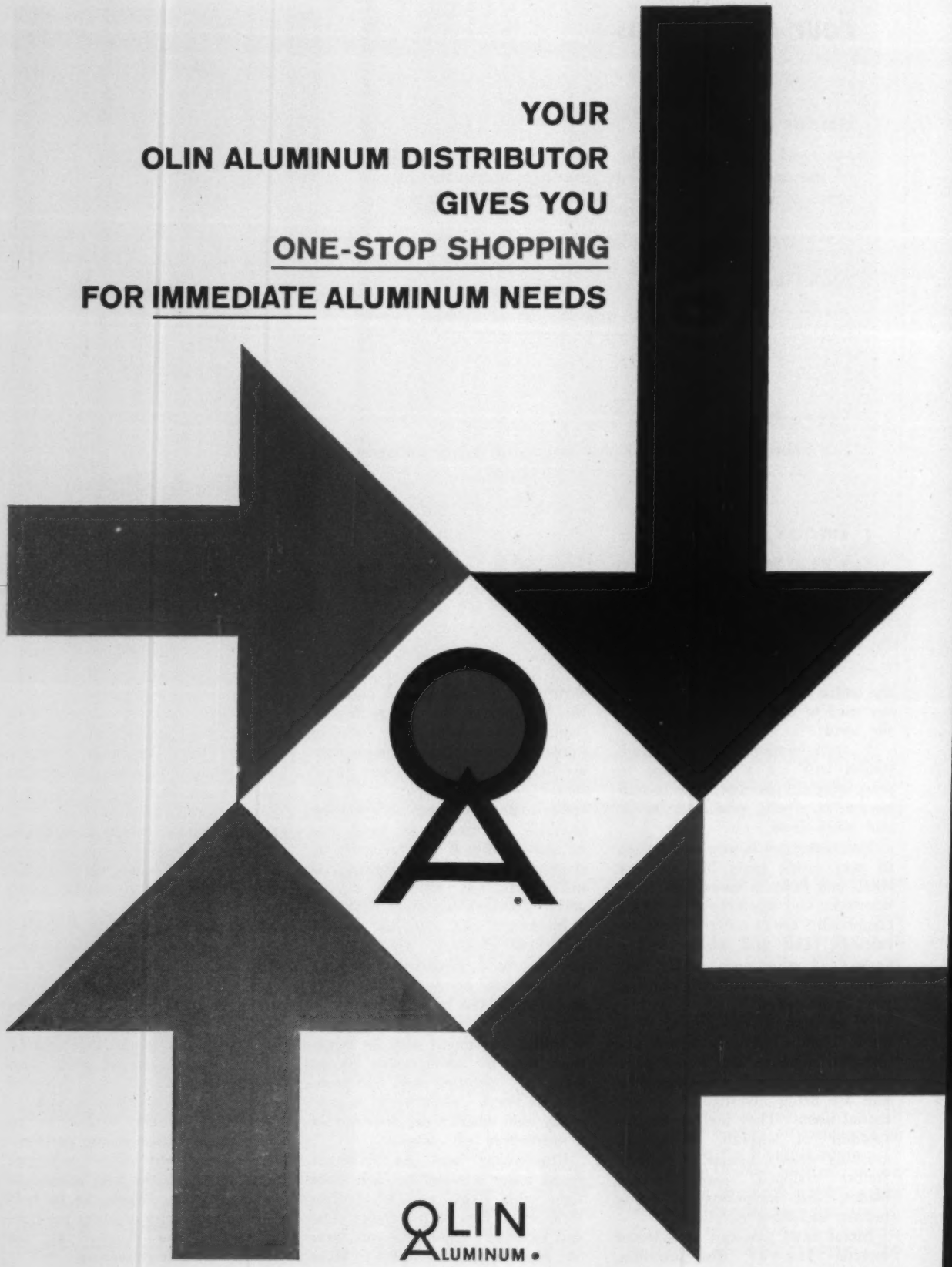

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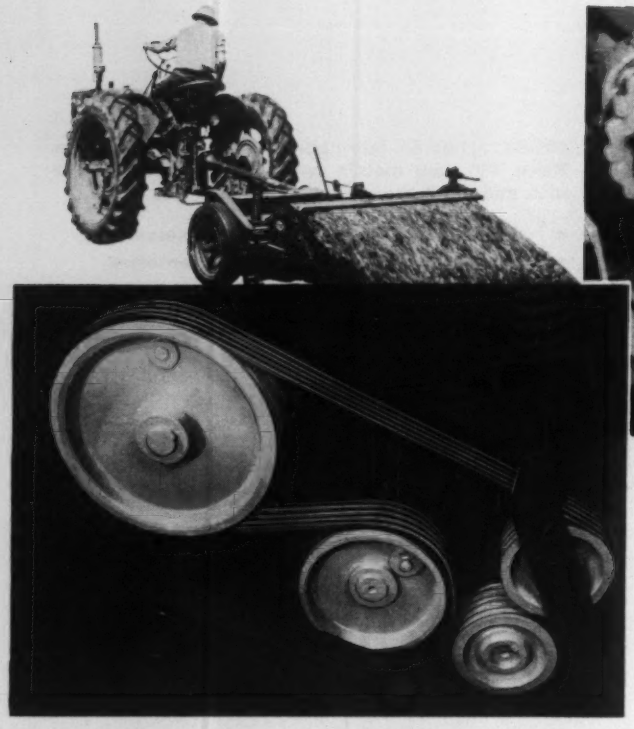

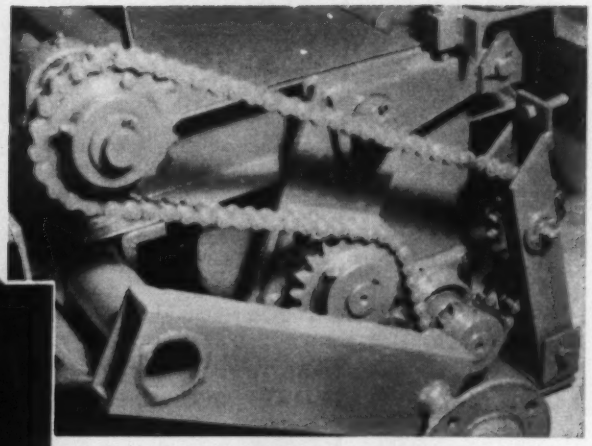

FORMER DRIVE: The high speed operation of Gehl's Cure-All Hay Conditioner caused failure of the roller chain drive.

PRESENT DRIVE: Both the limited space and high speed requirements were met with this Gates Super HC V-Belt Drive.

Gehl Brothers Manufacturing Company Finds

Super HC V-Belt Drive handles speeds chain drive couldn't take!

Roller chain drives on Gehl's Cure-All Hay Conditioners **"would not stand up under the speed of operation." Yet conventional V-belts that would fit into the space available could not handle the working load for this outstanding line of forage harvesting equipment.**

The design problem remained a tough one until the introduction of the Gates Super HC High Capacity V-Belt early last year. Then the Gates Field Engineer, working closely with Gehl Engineers designed the new drive shown above.

"The Super HC V-Belt Drive has eliminated need for shear pins and clutches, has increased efficiency, and lowered maintenance costs," is the pleased report from Gehl personnel.

Take advantage of Super HC on your equipment

Whenever you have a drive change on a new model or are replacing belts or sheaves, let your Gates Representative show you how Super HC Drives can reduce sheave diameters 30% to 50%, drive space up to 50%, drive weight and cost as much as 20%.

A handbook, "The Modern Way to Design Multiple V-Belt Drives," is yours for the asking. Simply contact your Gates Representative listed in the Yellow Pages.

TPA 505

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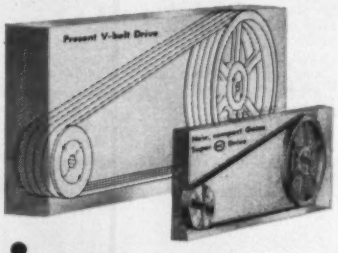


Gates Super HC V-Belt Drives same hp capacity in smaller "package"

Rotating Abrasive Saw Can Take 34 in. Wet Wheel

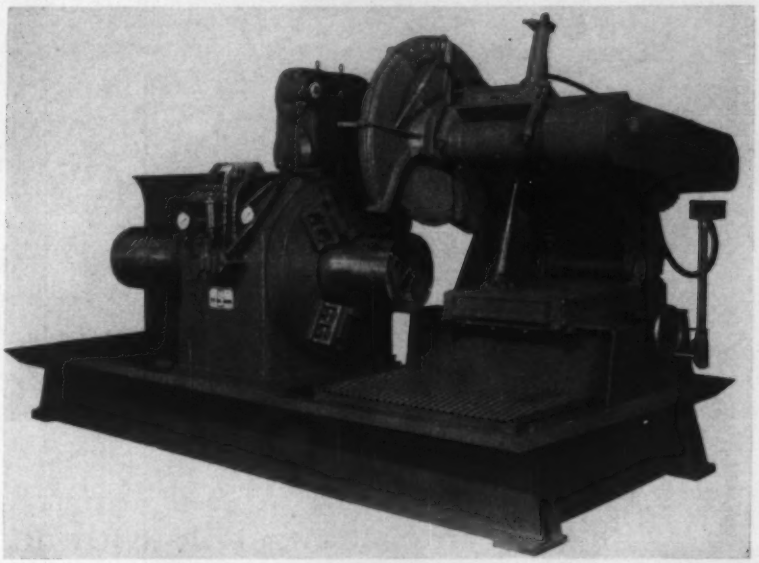
HARD-TO-CUT alloys can be cut in forms such as solids, shapes, and tubing by a Rotator abrasive saw. By rotating the material as it's cut, the saw keeps a cooler surface at the point of blade contact. Longer blade life results.

A chuck is used to hold rough forgings, squares, and conventional rounds up to 14 in. in diameter. The manufacturer says the unit is suitable for makers of rounds (up to 10 ft long) or squares in various grades of steel.

The saw can carry up to a 34 in. diameter wet abrasive wheel. The unit comes with a 60 hp main drive motor with a heavy duty Timken bearing arbor running in oil.

The wheel is fed into the material by a hydraulic ram (variable speed) controlled by the operator.

The material does not have to be machined or straightened to rotate underneath the saw blade. The saw is self-contained and portable and has its own integral tank and recirculation pump.



For further information, *write* Ty-Sa-Man Machine Co., 1103 White Ave., Knoxville, Tenn.

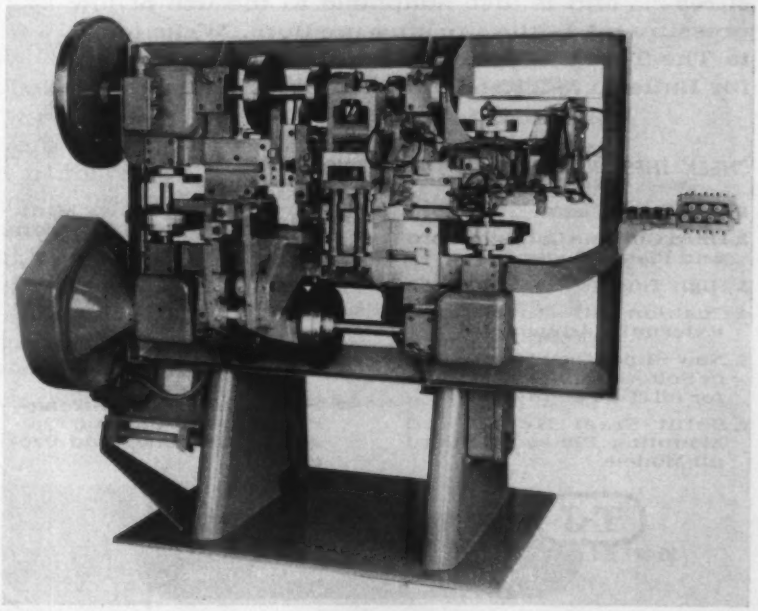
Forming Unit Uses Ribbon Metal or Wire Stock

FORMING machine (Model RWI-1) can be operated from 0 to 90 degrees for high speed production of stamped and formed parts of ribbon metal or wire stock.

The unit is flexible and saves time in tooling and maintenance. It will form and eject a part without restriction due to its operating angle.

Standard equipment includes a variable speed motor, automatic lubrication, and split cams at all forming positions. The machine has a versatile design form bracket with two vertical motions and a dual mounting symmetrical press unit which can be mounted at the front or rear of a metal line. Press units are rated at 4 tons. Two units can be mounted.

It will accept feed lengths up to 8½ in., wire diameter (mild steel)



interchangeable with all standard JIC cylinders

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4. Cushion Adjusting Screw, Externally Adjustable
5. New Super-Cushion for air, or Self-Aligning Master Seal for oil (T-J Patents)
6. Solid Steel Heads and Mounting Plates Standard all Models
7. Port Design Allows Minimum Pressure Drop on Inlet or Outlet
8. Chevron Type, Self-Adjusting Rod Packing
9. Piloted Packing Gland—Absolute Alignment
10. Piston Rod, Extra Strong—Polished and Chrome Plated for Efficiency and Protection

T-J TOMKINS-JOHNSON
RIVITORS . . . AIR AND HYDRAULIC CYLINDERS . . . CUTTERS . . . CLINCHORS

NEW PRODUCTS and equipment

to 3/32 in., and ribbon metal stock widths to 1½ in. Using a variable speed drive, 75 to 300 parts a minute can be produced. You can increase production to 400 parts a minute by incorporating high speed cams and short feed.

For further information, *write* Baird Machine Co., 1900 Stratford Ave., Stratford, Conn.

Rust Penetrant Doesn't Affect Rubber Parts

A RUST penetrant with a nonoil base is odorless, nontoxic, and nonstaining. The material (Du-01) is nonflammable and can be used on hot or cold surfaces.

It preserves rubber and does not swell natural or synthetic rubber parts. You can get the material in aerosol dispensers, pint and half pint spout cans, and 5 and 55 gal drums.

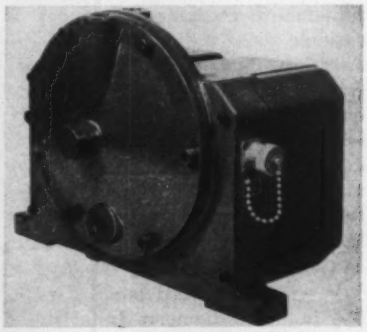
For further information, *write* Chemical Div., Supersite Corp., 310 Seymour Ave., Derby, Conn.

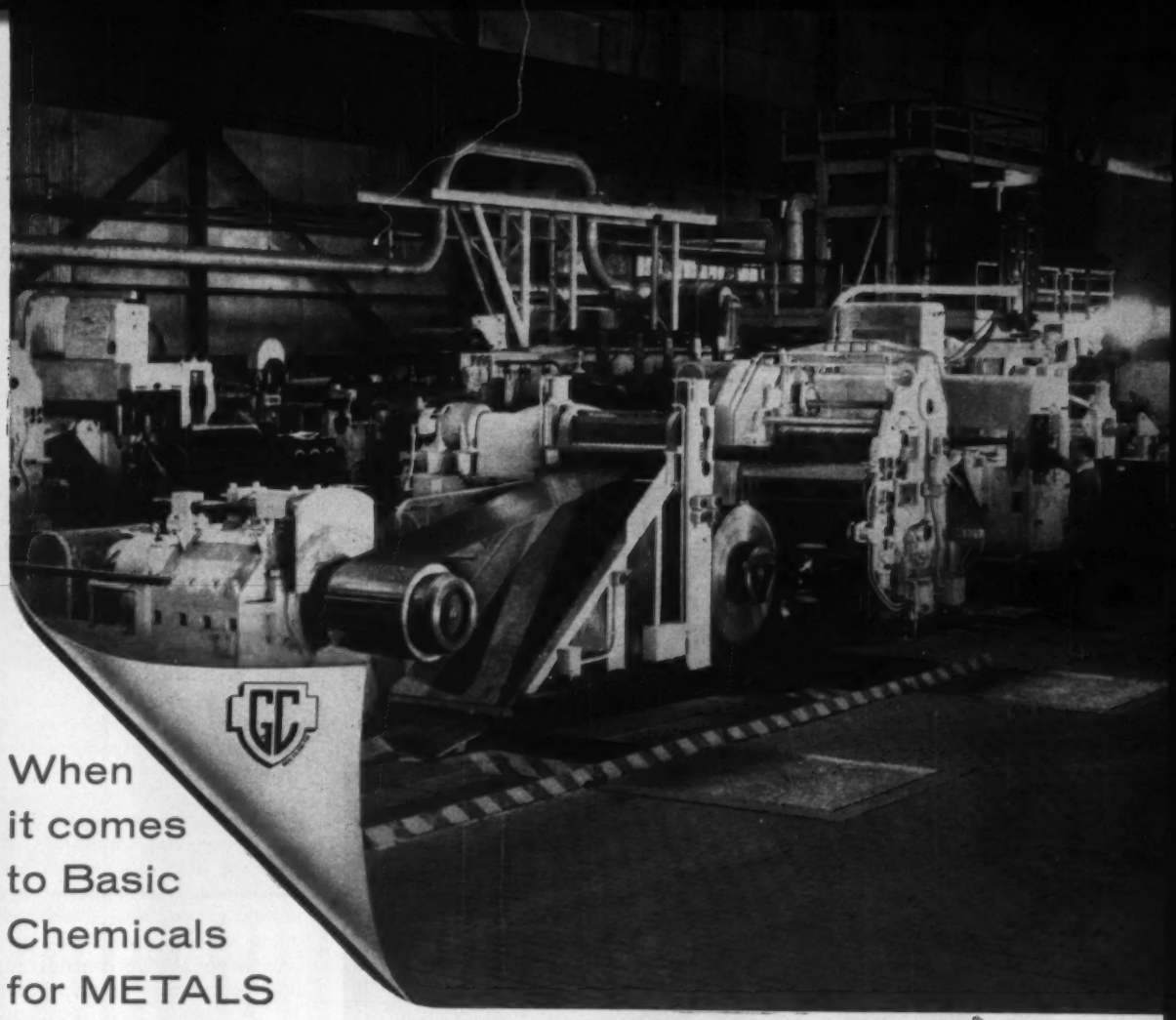
Units Convert Pressure To Electrical Signal

A FURNACE pressure transmitter (Model R787) has been designed for open hearth furnaces, soaking pits, slab heating furnaces, glass tanks, and similar applications. The unit comes with atmospheric pressure compensation to handle normal atmospheric pressure changes.

Standard differential pressure range is −0.05 to +0.15 in. of water column. Accuracy is ±1 per cent of range, or ±0.002 in. of water column. The unit is insensitive to changes in static pressure.

Transmitter output is a direct current voltage signal in the range





When it comes to Basic Chemicals for METALS

...come to General Chemical!

There are good basic reasons for making General Chemical your source of supply for basic chemicals. Our large-scale production is one. Long experience is another. And there are many more—including consistent high quality and uniformity of product... top-notch technical service... a coast-to-coast network of plants and distribution points... plus efficient follow-through from order to delivery and beyond that to satisfactory performance. That's why—when it comes to basic chemicals—it's wise to come to General Chemical for all these products....

- Sulfuric Acid
- Hydrochloric (Muriatic) Acid
- Nitric Acid
- Hydrofluoric Acid
- Sodium Fluoride
- Sodium Bifluoride
- Trisodium Phosphate
- Sodium Metasilicate
- Sodium Silicate
- Oxalic Acid
- Fluoboric Acid
- Potassium Fluoborate
- Sodium Fluoborate
- Ammonium Fluoborate
- Lead Fluoborate
- Tin Fluoborate
- Copper Fluoborate
- Iron Fluoborate
- Nickel Fluoborate
- Cadmium Fluoborate

Baker & Adamson® Laboratory Reagents

Basic to America's Progress

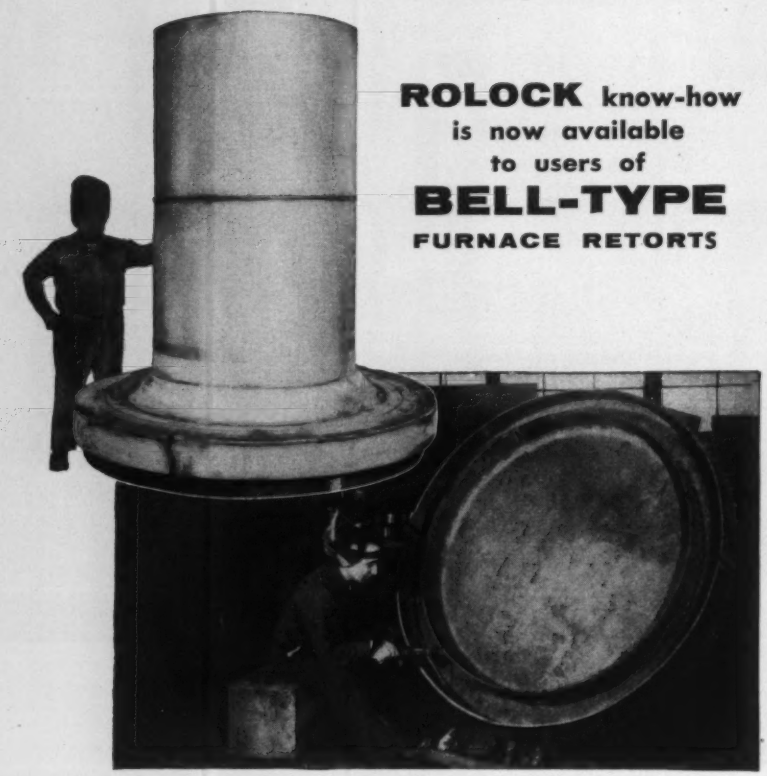
Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

ROLOCK®

FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT



ROLOCK know-how is now available to users of

BELL-TYPE FURNACE RETORTS

On the sound basis of PROVED performance, Rolock has become a major supplier of bell-type furnace retort hoods and bases. Photographs show examples of current production.

Rolock has the modern facilities required to handle these large welded fabrications with assurance of quality workmanship. Rolock engineering has contributed many design improvements, such as the incorporation of alloy in the bases to prevent cracking, and superior methods of reinforcement. Rolock skill in handling high nickel and straight chrome alloys is your promise of long service life. Finally, Rolock quality standards are maintained by any required forms of inspection.

Next time you order equipment of this type, call Rolock. You will not be disappointed.

SALES & SERVICE FROM COAST TO COAST

ROLOCK INC., 1262 KINGS HIGHWAY, FAIRFIELD, CONNECTICUT

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

8RL57

of 0 to 25 volts dc. Output power (as much as 5 watts) can be used directly and simultaneously by standard dc recorders and indicators, analog-to-digital converters, and electrohydraulic valve actuators. The unit has calibration adjustments.

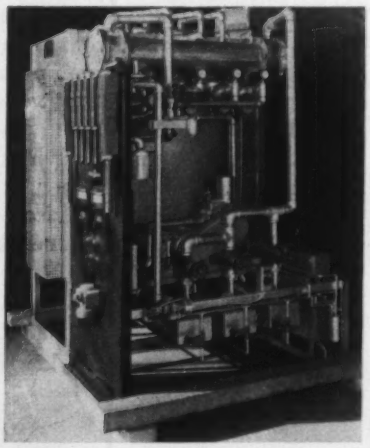
For further information, *write* GPE Controls Inc., 240 E. Ontario St., Chicago 11, Ill.

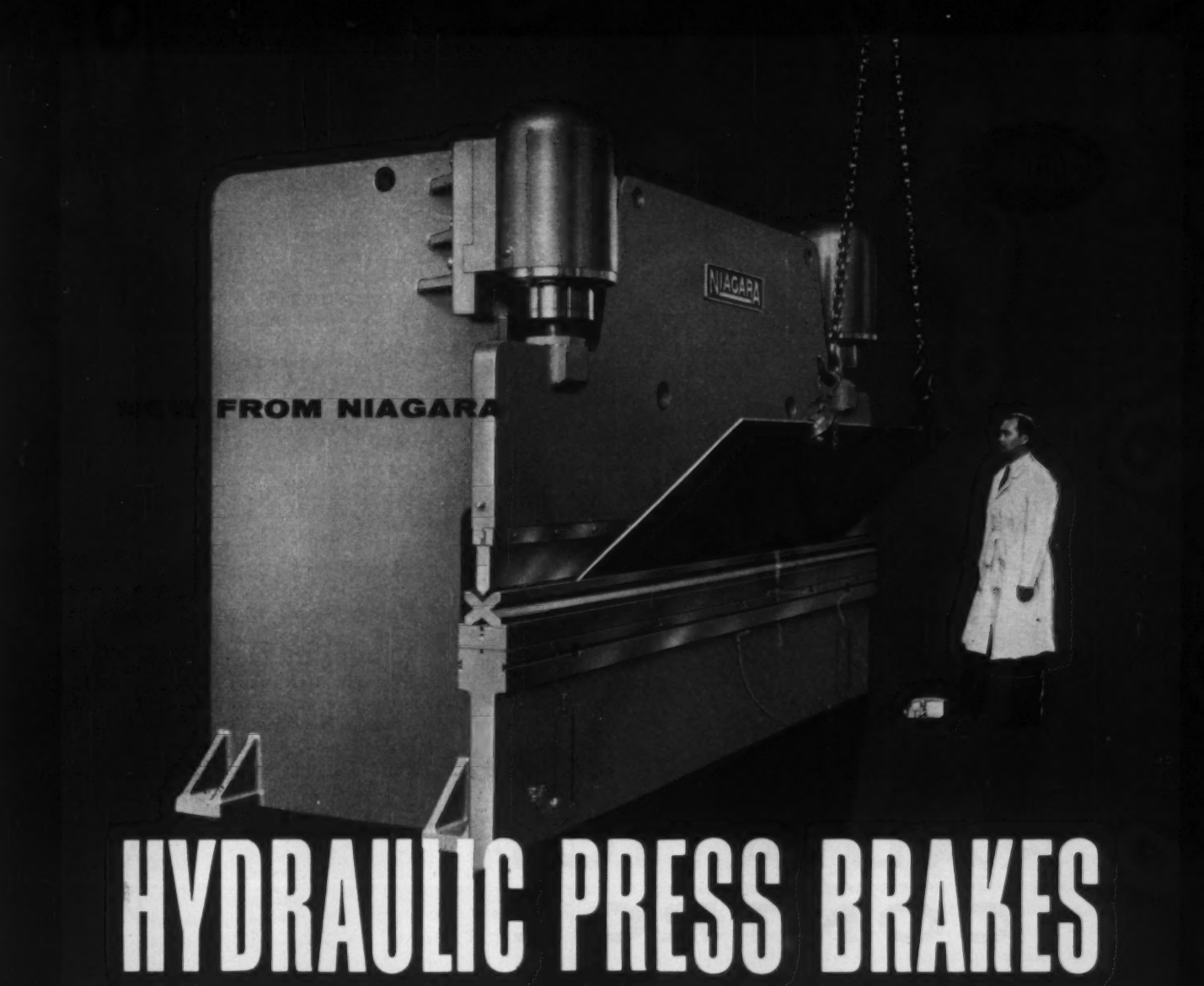
Endothermic Generator Has Modular Construction

YOU CAN obtain full rated endothermic generator output in the minus dew point range with the unit designated IGL-3005. The catalyst is completely heated and controlled at all loads and when necessary, may be made available for cleaning or easily removed for replacement.

To gain the advantages of modular construction, multiples of the standard 1000 cfh retorts are encased in a single chamber and operated in parallel. Each module gives equally predictable performance with a wide control range of dew points from minus to plus 60° F. A vernier flow meter supplements the carburetor settings. The unit produces 3000 cfh at minus dew points.

The unit has silicon carbide heating elements which permit operation up to 2000° F. The practically constant resistance of these ceramic elements eliminates tap transformers (to adjust power to overcome resistance changes during the heating





HYDRAULIC PRESS BRAKES

44 MODELS OF SMOOTH-ACTION POWER!

. . . from 200 to 1000 ton capacities . . . up to 24 ft. working lengths

It was bound to happen: the development by Niagara of a companion line of hydraulic press brakes ...the best obtainable today.

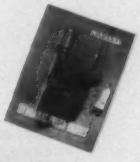
Designed for long stroke work at constant tonnage, these all-new machines complement Niagara's long-established mechanical press brake series. Together, they cover a tremendous range of sizes and capacities *. . . the most complete in the industry!*

As in the development of Niagara's mechanical press brakes, nothing has been spared in designing the hydraulic HD Series. Features like these are the direct result.

- *UNITIZED HYDRAULIC SYSTEM*...compact and easily accessible
- *NEW RAM LEVELING AND TILT CONTROL* ...maintains accuracy *without* complex hydraulic or electronic devices
- *LAMINATED, NON-METALLIC WAYS*...prevent welding or galling of bearing surfaces
- *SELF-ALIGNING BALL JOINTS*...apply force uniformly to ram without binding
- *DEEP, RIGID BED*...interlocked to frame
- *FRONT-OPERATED, LOWER LIMIT RAM ADJUSTMENT*...with dial type counter for fast duplication of previous settings
- *ADJUSTABLE TOP AND BOTTOM STROKE STOPS*...conveniently located
- *TELL-TALE FILTERS*...guardian of the hydraulic system

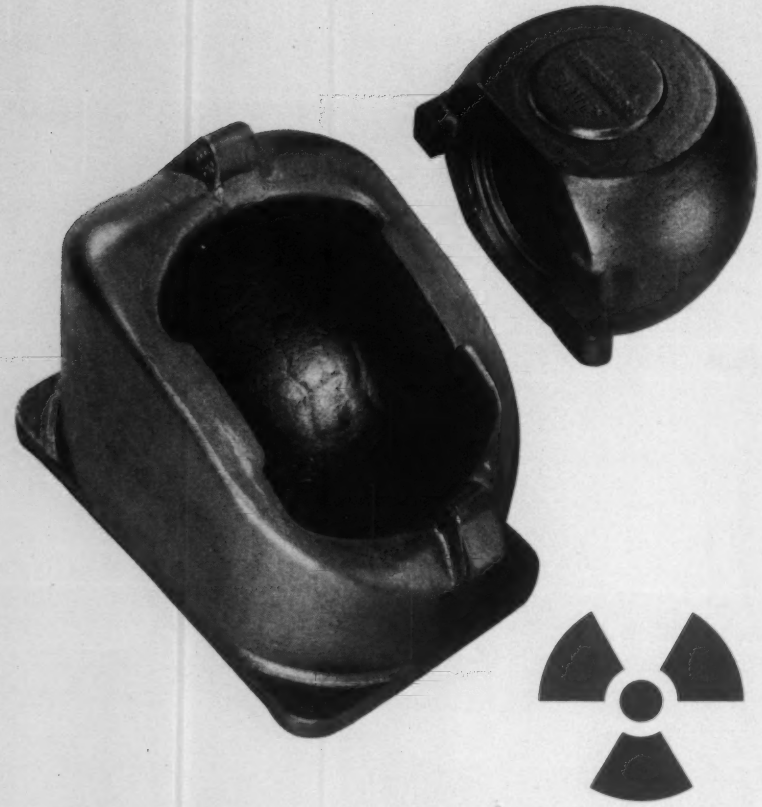
But this only *begins* to tell the story. For complete facts and figures, request Bulletin 91.

Niagara Machine & Tool Works, General Offices and Works: 683 Northland Avenue, Buffalo 11, N. Y., U.S.A. District Offices and Distributors everywhere.



NIAGARA

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.



RADIATION CONTROL

AccuRay® instrumentation is based on the radiation of gamma rays from a source unit containing radium-226 or cesium-137. Source units are effectively shielded by housings cast in Meehanite by Hamilton Foundry. The density, and soundness of Meehanite castings provide the positive protection essential for safe and reliable instrumentation.

When buying castings, the skill and integrity of Hamilton Foundry is your best insurance that specifications—and delivery schedules—will be met.

**AccuRay is the registered trade mark of Industrial Nucleonics Corporation*

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

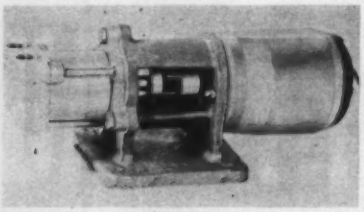
element life). A straight-through retort permits the catalyst to be renewed without removing the retort from the generator. When necessary, the labyrinth baffle can be removed to expose the bottom opening of the retort for inspection and cleaning.

You can add auxiliary piping, flow meters and valves to obtain individual control of each circuit at different dew points, rather than have all retorts feed into a common manifold.

For further information, *write* C. I. Hayes Inc., 822 Wellington Ave., Cranston 10, R. I.

12 Volt Battery Powers Pump-Motor Combination

A PUMP-MOTOR combination designed for water and similar fluids has noncorrosive construction. It has a bronze body, stainless steel rotor, carbon vanes, and Graphitar bearings. The unit measures 3-3/16 by 10-3/32 in.



It was specifically developed to run from an ordinary, 12 volt, dc battery. A 0.07 hp, series wound, dc motor (rated for 2300 rpm) is combined with a Tuthill pump with a capacity of 25 gph at 60 psi. They are connected with a bracket and coupling.

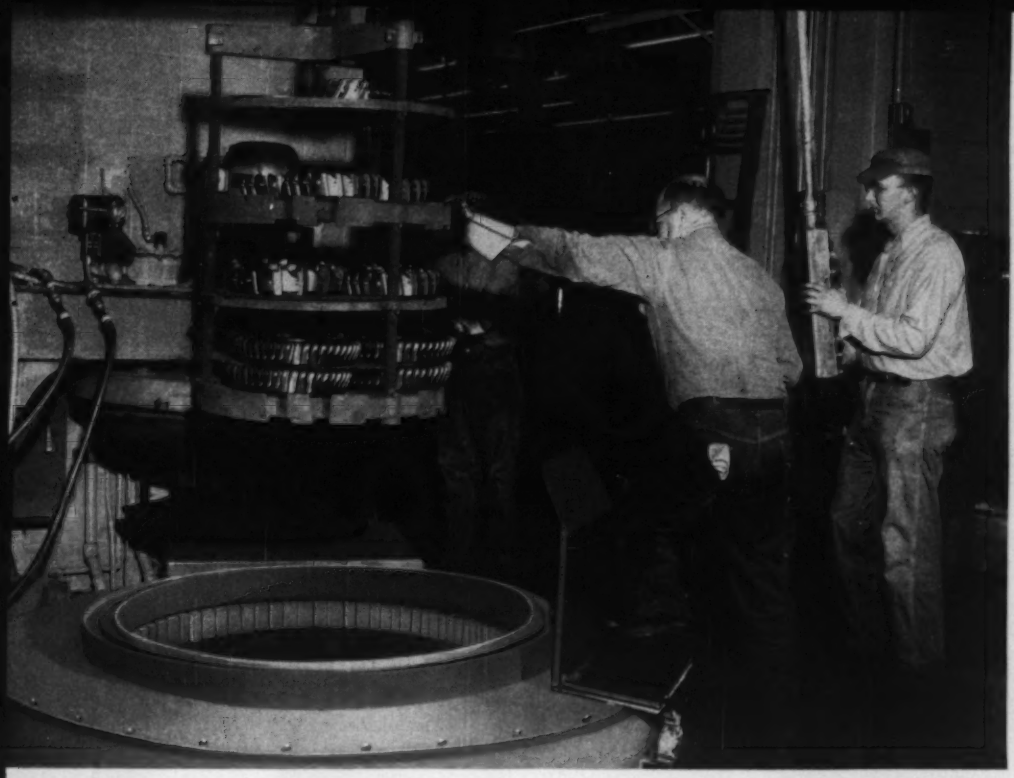
For further information, *write* Tuthill Pump Co., 939 E. 95th St., Chicago, Ill.

Bench Welder Control Weighs Only 21 lb

A BENCH welder control for resistance welding weighs 21 lb. The unit is a synchronous, precision, bench welder control in function and performance, says the company.

The control (Model 10E76E-C) is used on small welding machines

(Advertisement)



This Lindberg Furnace, Model CT3848-A, is being used at Ingersoll Milling Machine Company, Rockford, Illinois, for hardening Ingersoll inserted blade milling cutter bodies and also for gas carburizing. It is equipped with Lindberg's exclusive CORRTHERM electric heating elements. Temperature range 1850° to 2000°F.

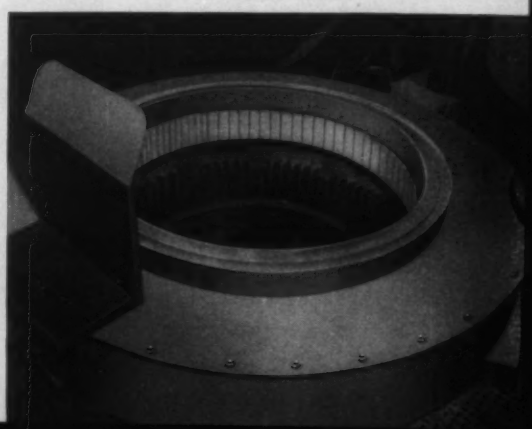
THIS VERSATILE LINDBERG FURNACE BELONGS IN MOST ANY METAL WORKING OPERATION

Heat treating installations across the country, captive or commercial, have found the versatility and dependability of this Lindberg furnace, either electric or fuel fired, a great production asset. Used at Ingersoll for hardening and carburizing, it is also ideal for a variety of heat treating needs including normalizing, annealing and tempering. This furnace occupies little floor space, handles a large volume of production and its rugged construction keeps maintenance costs uniformly low. At Ingersoll, it is one of several Lindberg furnaces in regular operation. Others include pit and box type Lindberg Cyclones and an L-type Furnace. Atmospheres are provided by Lindberg Hyen Generators.

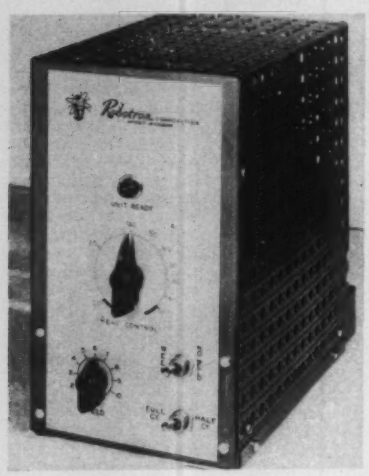
Lindberg has developed a wide variety of equipment for any industrial heat treating requirement. We provide everything from individual furnaces to complete, automated heat treating installations. These can either be factory-built or installed in your own plant. For the most satisfactory answer to any heat treating problem see your local Lindberg field representative (consult your classified phone book) or write direct to Heat Treating Division, Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg, Limited, Toronto.

Fixture being loaded with work while furnace is treating another load. Treated load will be removed and new load inserted quickly and easily.

CORRTHERM heating elements operate at extremely low voltage so heat leakage through carbon saturation is eliminated and shock or short hazard prevented. Makes possible use of electricity for carburizing without furnace retort.



NEW PRODUCTS and equipment



which can be operated within the limits of a 12 ampere, 50 per cent duty cycle, Thyratron contactor with input voltage of 115 or 230 volts, 50 or 60 cycle only.

For further information, *write* Robotron Corp., 21300 W. Eight-Mile Rd., Detroit, Mich.

Metal Primer Dries Tackfree in 15 Minutes

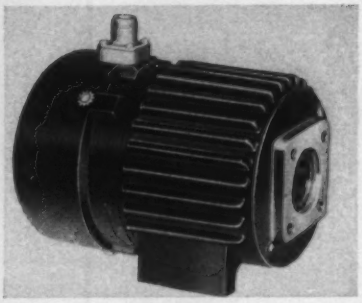
A METAL primer provides complete coverage over weldments, sharp edges, and other protuberances. The material, Clo-Flex 621, showed no deleterious effects under standard ASTM, 300 hour, salt spray tests. No color change was noted after exposure to 5 per cent nitric acid, 50 per cent sulfuric acid, and 5 per cent hydrochloric acid.

The paint can cover in one spray, brush, or dip exposure. In average conditions, the primer dries to a tackfree finish in 15 minutes.

For further information, *write* Harrington Paint Co. Inc., 1637 Collamer Ave., East Cleveland 10, Ohio.

Three Low Voltage Motors Run on Direct Current

THREE models of low voltage, dc motors in R&M frame size No. 4636 are available with or without radio

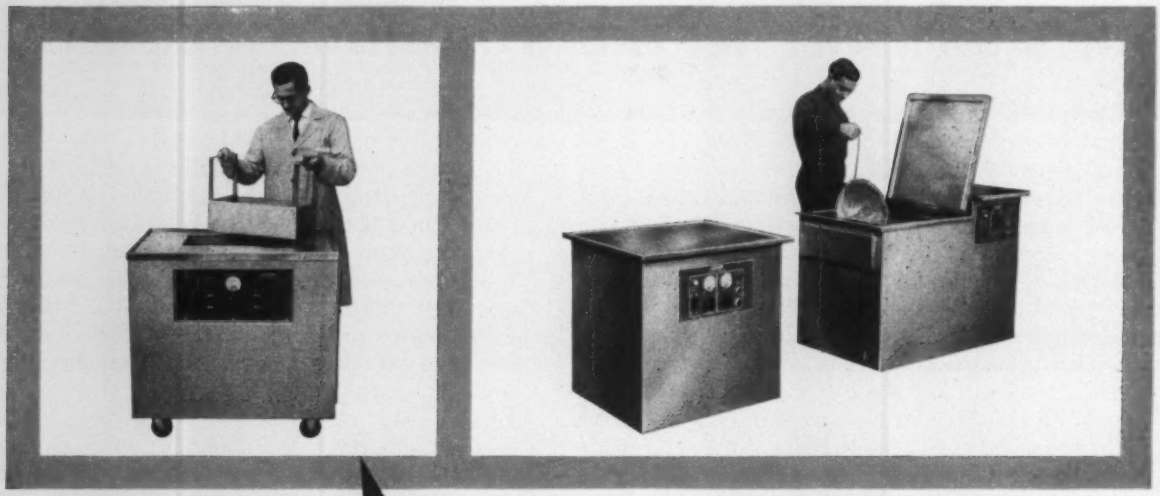


suppression. Winding designs: shunt, compound, or series type.

The motors are built in totally enclosed, nonventilated, or totally enclosed, fan cooled, cast aluminum housings and are equipped with ball bearings. Mountings include pad base and face type.

Typical ratings for this frame size: 1/6 hp, 3500 rpm, 12 or 24 volts dc; ¼ hp, 2100 rpm, 12 or 24 volts dc; and ⅓ hp, 3600 rpm, 24 volts dc. Each of the motors has a 5½ in. frame diameter and weighs about 14½ lb.

For further information, *write* Universal Motor Div., Robbins & Myers Inc., Springfield, Ohio.



SONOGEN®

the engineered answer to your cleaning problems...

Your success in ultrasonic cleaning rests on Branson's **engineering** approach — to the development of **Sonogen's** simple, rugged components — to their union into complete cleaning systems tailored to **your** needs. Our fourteen years in ultrasonics, seven of them in cleaning, have taught us the most efficient, economical way to clean everything from needle valves to strip steel — from ball bearings to complex castings. Our nationwide force of experienced, factory-trained specialists is ready to help you plan, install and maintain an **engineered** cleaning system you can depend on for years to come. Tell us **your** problem.

Since 1946 — The Respected Name in Ultrasonics

Branson ULTRASONIC CORPORATION
36 Brown House Road
Stamford, Connecticut

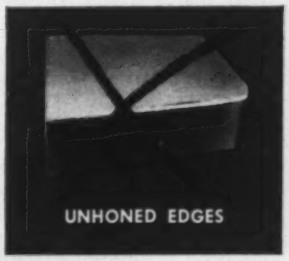
Metallurgical Memo from General Electric

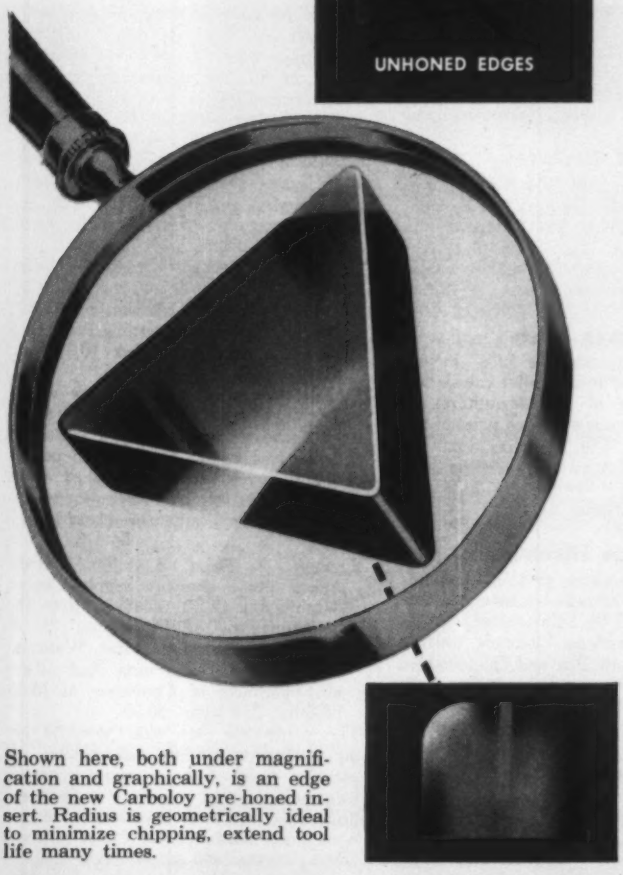
General Electric announces pre-honed CARBOLOY® inserts

Hand-honing is inaccurate, and time-consuming—frequently results in premature chipping and breaking.

Chamfered, or ground-flat, edges are geometrically weaker than a radius and are more easily chipped or broken.

Unhoned or as-ground inserts show rough edges—result in unpredictable tool life due to chipping.





Shown here, both under magnification and graphically, is an edge of the new Carboloy pre-honed insert. Radius is geometrically ideal to minimize chipping, extend tool life many times.

Now you get more predictable tool life... lower cost per cutting edge ...no hand-honing cost!

Ready-to-use... honed to a precise radius... promise BETTER PROFITS THROUGH BETTER TOOLING

Now General Electric Carboloy inserts are pre-honed *at the factory!* Here's what it means to you:

1. An insert with edges honed to precise *radii* gives the strongest geometric shape to withstand cutting pressures. This reduces chipping – increases the predictability of tool life. Hand honing *cannot* achieve precise radii – G-E pre-honing can . . . and does!

2. Since chipping is minimized, fewer cutting edges are wasted. The result is lower cost per cutting edge.

3. Since inserts come pre-honed and ready-to-use, the labor cost of hand honing is eliminated. This more than offsets the charge for pre-honing.

4. Pre-honed Carboloy cemented carbide inserts have standard edge radii honed to a greater or lesser degree, depending on the job to be done. You'll *know* the honing is right!

Ask your Authorized Carboloy Distributor about pre-honed Carboloy inserts, convertible seats, toolholders, and brazed tools. Or, write: *Metallurgical Products Department of General Electric Company,* 11141 *E.* 8 *Mile Road, Detroit* 32, *Michigan.*

TOPS IN TOOLING QUALITY

From the research and quality-control facilities of the Metallurgical Products Department of General Electric comes the outstanding quality tooling line in the metalworking industry. The new Carboloy pre-honed inserts, as well as the complete line of Carboloy toolholders, inserts, insert seats, convertible seats, and brazed tooling, are designed to meet every tooling need efficiently and economically.

CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES
MAN-MADE DIAMONDS • MAGNETIC MATERIALS
THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

For Quality and Economy Use

MALLEABLE

For Service Contact...

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Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

NEW literature

Write directly to the company for a copy

Steel Catalog

A steel catalog comes in a convenient pocket size for purchasing agents, estimators, and other users. In addition to a complete listing of specifications, it contains technical and helpful facts for calculating steel requirements. Fisher Bros. Steel Corp., Nordhoff Place, Englewood, N. J.

Running Gear Handbook

A 45 page catalog can be used as an engineering handbook to design a complete running gear assembly (military and commercial). Ground Handling Div., Hadco Engineering Co., 2861 E. Slauson Ave., Huntington Park, Calif.

Rolled, Strip Tubing

An eight page brochure describes a seamless light wall tube that is processed in strip form and is rolled up for shipment. Handling, inflation, and fabrication are discussed. Wolverine Tube Div., Calumet & Hecla Inc., 17200 Southfield Rd., Allen Park, Mich.

Beryllium Tubing

Pure beryllium tubing is described in Data Memorandum No. 26. It discusses physical and mechanical properties and the composition limits. Toxicity of beryllium dust and compounds such as beryllium oxide is covered. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Steel Bonded Carbides

A nine page reprint, "Carbides of Elements of the Fifth Group of the Periodic Table Bonded with Steel," reports the results of an investigation on these cermets. Sintercast Div., Chromalloy Corp., 132 Woodworth Ave., Yonkers 2, N. Y.

Industrial Truck Costs

Four complete booklets offer factual cost histories and formulas for calculation and comparison of all expenditures in owning and operating various types of industrial trucks. The bulletins total 62 pages. Exide Industrial Div., Electric Storage Battery Co., Rising Sun & Adams Avenues, Philadelphia 20, Pa.

Welding Case Histories

A 12 page booklet (F-1379) contains illustrated case histories of time and cost savings obtained by Unionarc welding in industrial applications. Unionarc welding is a semiautomatic flux and CO_2 shielded process for welding steel. Linde Co., a division of Union Carbide Corp., 270 Park Ave., New York 17, N. Y.

Thermal Insulation

"Rethinking Thermal Insulation" is a guide to the use of thermal insulating materials. Detailed descriptions and characteristics of various types are given. The booklet contains an index to ASTM and government specifications. National Insulation Manufacturing Association, 441 Lexington Ave., New York 17, N. Y.

Liquid Gas Handling

A four page booklet presents the principles and techniques of handling, storing, and converting liquefied oxygen, nitrogen, and argon. In addition, storage and delivery equipment and advantages of storage in the liquid state are discussed. Specify Form ADC 935. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Mechanical Deburring

A four page folder, "Mechanical Deburring News," details four methods of mechanical deburring and discusses applications. Case histories show how costs can be reduced. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Arcwelding Electrodes

A pocket size card gives application information on mild steel arcwelding electrodes and explains how to identify them according to American Welding Society-American Society for Testing Metals classification. Hobart Bros. Co., Troy, Ohio.

NEW BOOKS

Basics of Induction Heating (two volumes), Chester A. Tudbury, John F. Rider Publisher Inc., 116 W. 14th St., New York, N. Y. 284 pages in two volumes, soft cover $3.90 each or $7.80 for set; cloth binding $8.90 for set

Fundamental principles of induction heating and application of equipment are presented, using the pictured text approach. The electrical and thermal aspects of induction heating are discussed and mechanical problems in fixturing are explained. A glossary is included in each volume.

The Corrosion and Oxidation of Metals, Ulick R. Evans, St. Martin's Press Inc., 175 Fifth Ave., New York 10, N. Y., 1094 pages, $25

At least one third of this book covers such things as protection of steel structures, corrosion inhibitors, and treatment of boiler feed water. It includes hundreds of literature references to published works of other investigators. Scientific aspects and practical applications are presented.

Strength of Metal Aircraft Elements, Armed Forces Support Supply Center, Washington, D. C. (available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.; also from field offices of Department of Commerce as MIL-HDBK), 251 pages, $2.50

The publication has wide potential use not limited to aircraft and missiles. It provides design data for many materials commonly used in structural applications. Sections of the book discuss steel, aluminum, magnesium, titanium, heat resistant alloys, bronzes, and copper alloys.

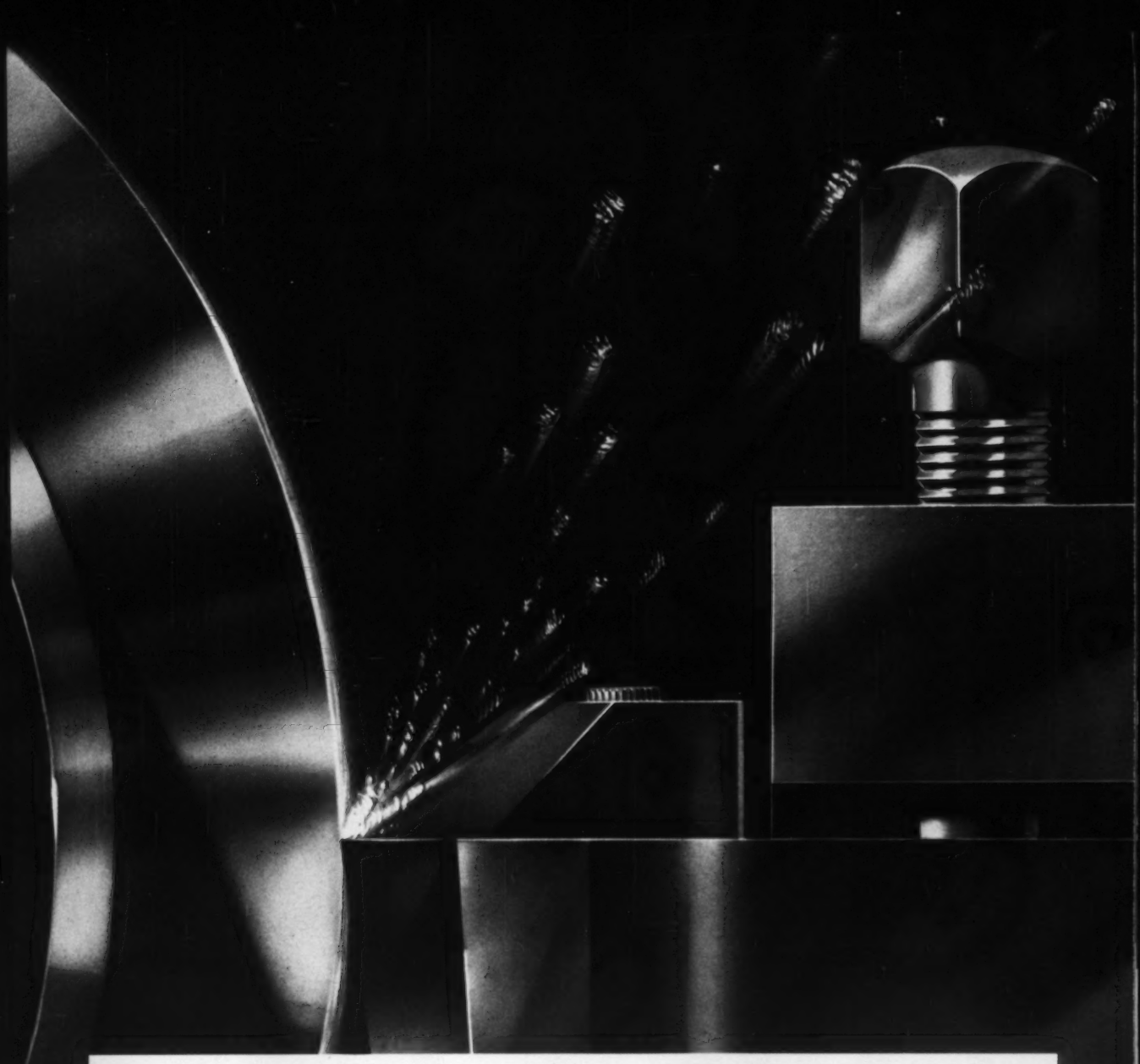

Illustration of Malleable casting being turned at 1,400 surface feet per minute with a 0.100" depth of cut using an oxide tool.

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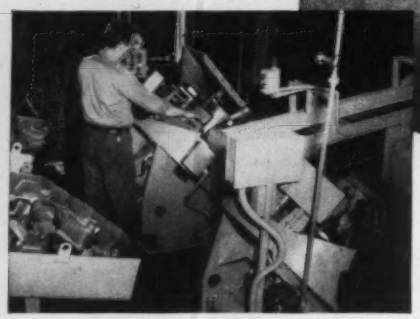
For detailed information on "Machinability of Malleable Castings", contact any of the progressive companies listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.



Operator loads automatic rotating TOCCO fixture for hardening rear spring hangers.

The job they said "couldn't be done"

now being hardened—1 every minute

with TOCCO Induction Heating*

This unusually shaped part is a rear spring hanger used in the spring suspension system of a major truck manufacturer. The hardness pattern covers the "flat" section, which actually isn't flat but blends two widely varying radii, and the sides or "ears" a portion of which must be hardened to the same depth—.060" to .090". Nine of these irregularly shaped castings are loaded in a rotating fixture and scanned progressively by a TOCCO inductor block at the rate of one per minute. An air gap of .060" is maintained between the inductor and the part—quite a tricky achievement since the spring hangers are unmachined castings with normal foundry tolerances of ±.045".

This job is typical of many where TOCCO engineers have worked out a satisfactory and reliable production setup for a supposedly impossible heating job. If you have a difficult heating job—hardening, brazing, soldering or heating for forming or forging it will pay you to consult TOCCO—without obligation, of course.

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Next Seven Weeks to Be Slow

THE WORST is over, but steelmakers have no illusions about a quick recovery. From now until September, the upward movement will be gradual. New orders will be hard to get until: 1. Vacation shutdowns end. 2. Automakers start producing next year's models. 3. Other consumers stop liquidating their inventories.

SUPPORT LACKING— Scarcely any rebound was noted when the market hit bottom last week. The reason was obvious: Lack of support from the big buyers—service centers, construction, converters, appliance manufacturers, and the oil and gas industry. In most cases, the problem is one of inventory adjustment. Users overestimated their requirements and are pulling their stockpiles down to the level that consumption seems to justify.

DELIVERIES DELAYED— Orders placed in June for July delivery are being deferred until August or September. In the East, requests for delayed delivery are coming from converters, furniture and appliance manufacturers, and fabricators of shipping containers and boilers. With the vacation season at hand and end-use consumers curtailing orders, buyers are inclined to coast for a few weeks.

DISTRIBUTORS LOADED— Service center inventories are at an all-time high of 3.8 million tons—100,000 tons larger than they were before the strike and 300,000 to 400,000 tons above the poststrike target set by the Steel Service Center Institute. Distributors expected the first half to be 10 per cent better than the like period of 1959. Instead, it was 10 per cent worse. When business fell off, they didn't have time to cut their orders from the mills. In January, it was believed that service centers would ship about 8.5 million tons this year. Now, trade sources are predicting 7.5 million to 7.8 million tons (vs. 9.3 million last year).

APPLIANCES OVERSTOCKED— Cutbacks from the appliance industry have been severe and there are no indications that orders are firming. In January, most appliance makers expected their 1960 sales to top last year's by 5 per cent, so they placed big orders for steel. Now, it's apparent that their hopes won't be realized. In the first five months of the year, factory shipments of refrigerators were 5 per cent lower than in the like period of 1959. Shipments of home laundry equipment were down 9 per cent. Distribution channels are overburdened with unsold finished goods.

AUTOMAKERS ACTIVE— During the first half, automakers and their suppliers did more than any other purchasers to support steel industry operations. In assembling 4.4 million cars and trucks—16 per cent more than they built in the first half of 1959—they took 22 per cent of the finished steel shipments. The impact of first half automotive production on the U. S. steel industry would have been even greater except for two factors: 1. About 25 per cent of the cars were compacts, requiring only two-thirds of the steel that is used in an auto of standard size. 2. Because of the steel threat, some automakers agreed to take part of their steel from foreign suppliers.

PRODUCTION PLUMMETS— Last week, production fell to the lowest level of the year as steelmakers extended their July 4th shutdowns. Furnaces were operated at 42.7 per cent of capacity, 10.3 points below the previous week's revised rate. Output: About 1,218,000 ingot tons.

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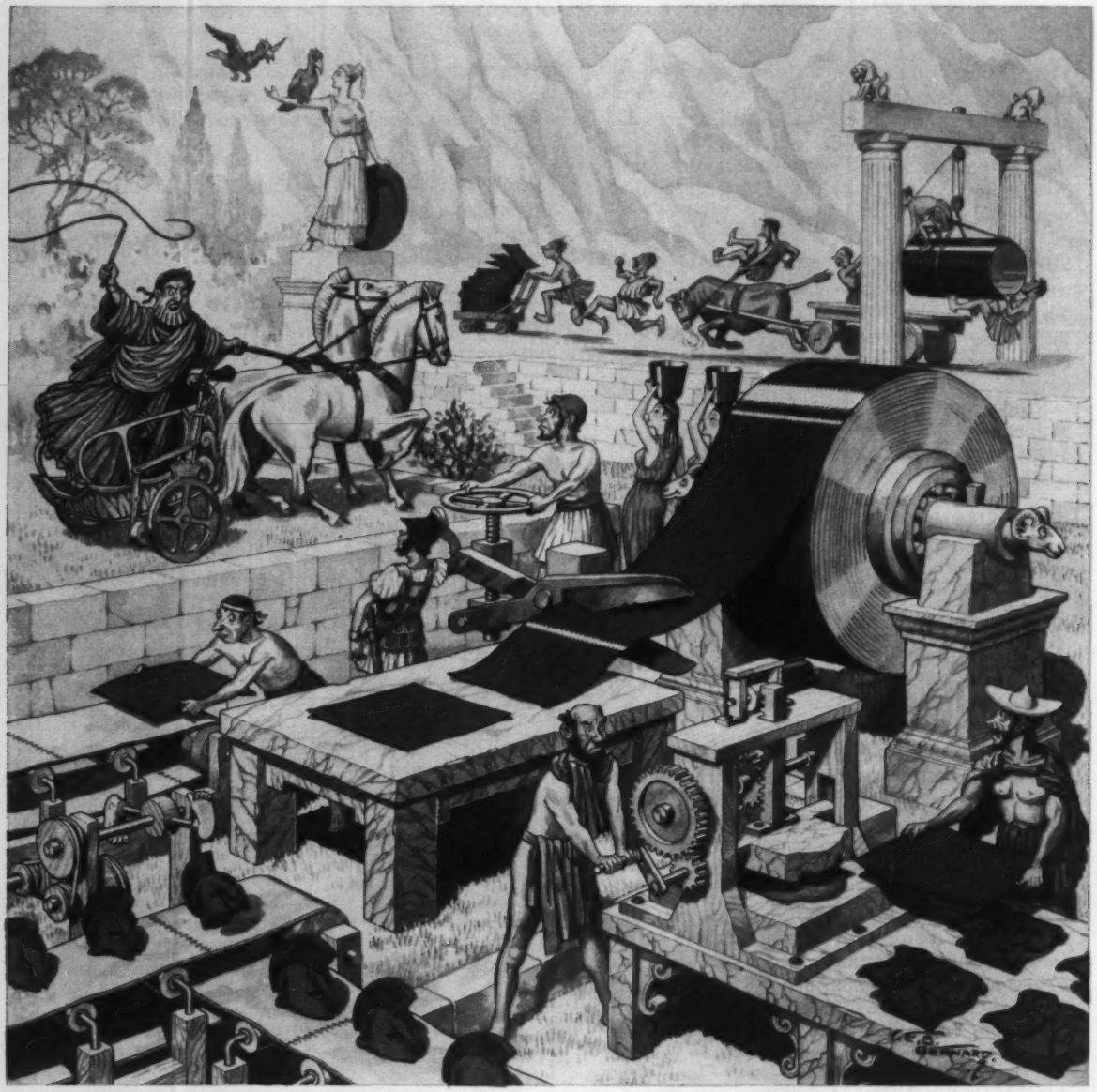
*Current prices were published in the July 4 issue and will appear in subsequent issues.

Now it can be told

This engraved marble tablet recently uncovered in one of the long-lost Phrygian caves shows how Midas fooled the public. This stuff wasn't 14-karat at all. The "Midas Touch" is nothing but a myth. Midas used ColorRold* Stainless Steel, developed by Washington Steel Corporation. Gotta give the old charlatan a lot of credit though—he knew a good thing when he saw it.

MIDAS SPECS: 2 cubits × .025″ ± .001″ × coil, Type CCCII (302), Rb 82 max. Sunbrite gold, 50 glossimeter, 1 mil, paper interleaved, skidded for open oxcart only. 12 × 10^6 drachma max. wt. per coil.



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WOODLAND AVENUE WASHINGTON, PA.

How Steel Imports Shape Up

They'll decline in tonnage this year, their prices will be held down, but the foreign competition will not fade away. Here's the situation:

- Imports of steel (1,731,841 net tons) in the first four months of this year were 55 per cent greater than the 1,117,658 tons brought in during the corresponding period of 1959—the record year.

- While the steel imports total for the first four months of this year exceeded the total for the like period of last year, the total for all of 1960 will likely be lower than the 1959 record of 4,391,791 tons. Much of the increase in early 1960 was from bookings inspired by last year's steel strike. Imports in April fell slightly below those of April, 1959.

- Some of the tonnage brokers hopefully ordered last year has had to be sold at reduced prices.

- Reduced buying of steel in the U. S. will hold down prices of imported steel. These prices fluctuate with demand.

- Foreign producers of steel, able to sell below U. S. prices, will continue to find markets here, particularly on common, standard products.

- Belgium-Luxembourg is the leading exporter of steel to the U. S., but Japan is the No. 1 source of wire rods and wire nails. Japan supplies almost a third of the imports of wire rods and more than a third of the nails.

- Biggest tonnage of steel imports is in sheets and strip (hot rolled and cold rolled), but they aren't felt nearly as much as imports of reinforcing bars, wire rods, wire nails, barbed wire, and wire fencing. Imports of sheets and strip are equivalent to less than 3 per cent of the U. S. output, while with the other products it's from 30 to 115 per cent. The U. S. imported more barbed wire than it produced.

- Impact of imports is felt in varying degrees by U. S. steel companies. Most severely hurt are those specializing in wire and wire products and reinforcing bars, and those situated in the areas where most of the imports are coming in, particularly the Southeastern and the Gulf Coast states.

- More steel comes in at Galveston, Tex., than at any other port in the U. S. New York is second. New Orleans is third.

- While steel imports have turned downward, steel exports have climbed each month this year, but they're still less than imports.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio.*

8 Main Foreign Steel Sources

(Net tons brought into U. S. in first four months, 1960)

Belgium-Luxembourg	473,475
West Germany	343,728
Japan	243,866
France	182,389
Canada	134,060
United Kingdom	117,768
The Netherlands	52,723
Italy	48,413

Top 7 Steel Import Areas

(Net tons of steel brought in during first four months, 1960)

Galveston, Tex.	272,254
New York	253,297
New Orleans	199,386
Los Angeles	164,849
Maryland	144,118
Michigan	134,235
Florida	116,198

6 Leading Imports of Steel

(Net tons—First four months, 1960)

Sheets and strip (Hot rolled and cold rolled)	289,311
Pipe and tubing	212,191
Structurals	192,023
Reinforcing bars	172,404
Plates	172,069
Wire rods	163,050

Imports of 5 steel products vs. domestic mill shipments

(Net tons—First four months, 1960)

Product	Imports (Sources and amounts)		Domestic Mill Shipments
Reinforcing bars	Belgium-Luxembourg	74,824	
	West Germany	26,732	
	Japan	24,251	
	France	22,660	
	All others	23,937	
	TOTALS	172,404	633,312
Wire rods	Japan	50,900	
	West Germany	32,471	
	France	19,066	
	Italy	13,923	
	United Kingdom	12,901	
	Belgium-Luxembourg	9,874	
	All others	23,915	
	TOTALS	163,050	444,471
Wire nails	Japan	36,872	
	Belgium-Luxembourg	18,703	
	Italy	10,149	
	West Germany	7,198	
	The Netherlands	5,874	
	All others	17,894	
	TOTALS	96,690	127,600
Barbed wire	Belgium-Luxembourg	13,004	
	West Germany	4,418	
	All others	3,654	
	TOTALS	21,076	18,395
Wire fencing	Belgium-Luxembourg	11,789	
	All others	2,074	
	TOTALS	13,863	45,906

Sheets, Strip . . .

Sheet & Strip Prices, Pages 140 & 141

Further cutbacks in sheet orders are being reported by some producers. Orders originally scheduled for shipment in early summer are being deferred until late August and September in some cases. Suspensions for mass vacations at manufacturing plants, plus a dip in end-use requirements are resulting in a continued lag in business.

Hot rolled sheets are available for shipment in two to three weeks, cold rolled in three to four (if bands are available). Four and five weeks seem to be the story on galvanized sheets, for which demand has been relatively stronger than for other sheet grades in recent months.

Business in electrical sheets and enameling stock reflects the decline in demand for electrical appliances, which decline also affects the larger tonnage sheet grades as well. Sheet specialties are available for relatively nearby shipment.

The Midwestern mills are in position to give fast deliveries on all products. For example, plates can be had in one week, sheets (hot rolled sheets and coils) in two to three weeks, cold rolled sheets in three to four weeks, and the same for enameling and electrical sheets. Galvanized sheets are available for July shipment, with electrolytic tin plate shipments open for August.

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Steel Bars . . .

Bar Prices, Page 139

Hot rolled carbon bar producers report a pronounced lag in new orders. They see little improvement in the immediate future. Warehouses are well stocked and the cold finishers appear to have plenty of hot stock on hand. The fastener makers are also more than comfortably fixed on bar supplies, while the railroads and railroad equipment builders are specifying lightly.

Producers of cold finished carbon bars and hot and cold finished alloys face the same sort of situation. Business is quiet all around. Hot bars are available for shipment within two to three weeks, and some cold finished bars can be had from stock.

A pickup in August, extending well into the fourth quarter, is anticipated.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 140

Production of reinforcing bars is dragging, and indications are there will be no change in the situation in the immediate future. Fabricators' inventories are in good shape. Demand for mesh is also off.

Expectations are that federal highway lettings will increase this month, but it's too early to say how much. The states still don't know how much work will be on the interstate program.

Bar mill executives in the Pacific Northwest report steady operations with considerable business being placed in small lots.

Semifinished Steel . . .

Semifinished Prices, Page 139

The national ingot rate may have hit a low for the year last week. The American Iron & Steel Institute reported the rate at 42.7 vs. 53 the week before. It was the lowest weekly rate reported for any non-strike week since the Fourth of July holiday week in 1949.

Output for last week is estimated at 1,218,000 tons against 1,510,000 the preceding week and 1,128,000

in the Fourth of July week in 1949.

Most observers believe the week should mark the end of the decline.

Wire . . .

Wire Prices, Pages 141 & 142

Lower prices on merchant wire products were announced last week by Atlantic Steel Co., Atlanta, Ga. A functional allowance of 4 per cent to the jobbing trade on the net mill value is allowed, and order quantity extras, commodity quantity extras, and item quantity extras have been eliminated. The tonnage necessary for the company's minimum price basis is reduced from 40,000 to 30,000 lb.

The new schedule does not provide for shipments of less than 30,000 lb, but this service can be performed subject to extras, quoted on request. Atlantic's new schedule:

	New Price
Wire nails	Col. 173
Polished staples	Col. 173
Galvanized staples	Col. 173
Merchant quality wire, coils:	
Annealed	$9.00 per 100 lb
Galvanized	9.75 per 100 lb
Woven wire fence (20 rod rolls)	Col. 191
Barbed wire	Col. 197
Bale ties	Col. 212

Another producer, Colorado Fuel & Iron Corp., Denver, announced a new schedule of prices on automatic baler tie wire, as follows:

Coil No. 3150	$9.02 per 97 lb net box
Coil No. 6500 standard	9.30 per 100 lb net box
Coil No. 6500 interim	9.35 per 100 lb net box

Distributors . . .

Prices, Page 146

Bookings by steel service centers remain disappointingly light. However, in general, they are doing a little better at the moment than the steel producers.

Some buyers (fabricators, contractors, and large industrial users) are turning to service centers for their steel needs because mills in many instances do not have the minimum amount of orders to produce certain products economically. The vacation period and shutdowns for lack of orders have combined to restrict activity at the mills below normal seasonal levels.

One distributor in the Birmingham district gave a description of the situation which is typical for the industry as a whole: "Currently, our level of business and volume is about the same—all bad and very unsatisfactory for the past year—but we look for an upturn the latter part of this year."

In an effort to attract some of the business that has been going to the mills, several service centers in the Seattle district have added a 30,000 lb bracket above the regular 20,000 lb for a three month trial period.

Tubular Goods . . .

Tubular Goods Prices, Page 145

Contract to install a 22 mile, 8 in., crude oil pipeline from the Swanson oil fields to a deep sea terminal on Kenai Peninsula, Alaska, has been placed with J. Roy McDermott Co., Los Angeles, by Kenai Pipeline Co., an affiliate of Standard Oil Co. of California.

Texas Eastern Transmission Corp., Houston, last week announced plans for a 50 million cu ft expansion in its daily delivery capacity of its natural gas pipeline system. Proposed new facilities include about 66 miles of 30 in. diameter pipeline loops to be added to the company's system between Vidor, Tex., and Lambertsville, N. J.

Hughes Tool Co. reports active

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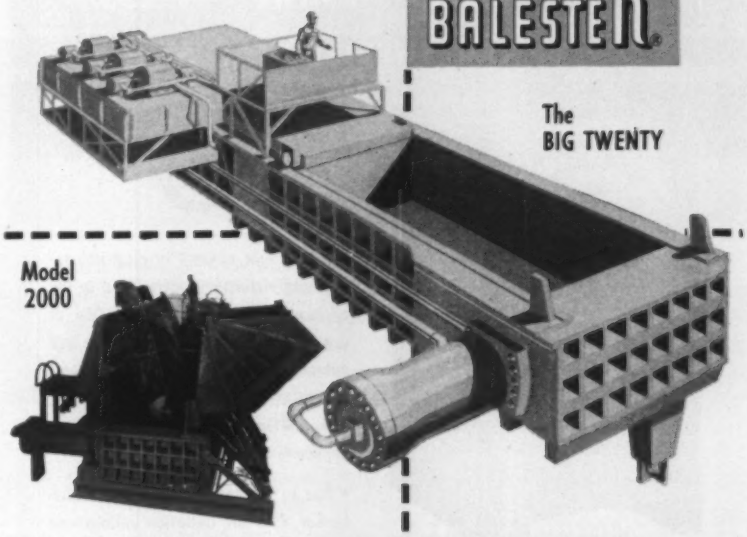
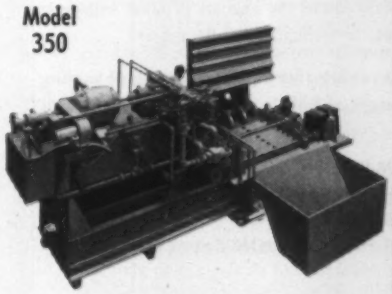
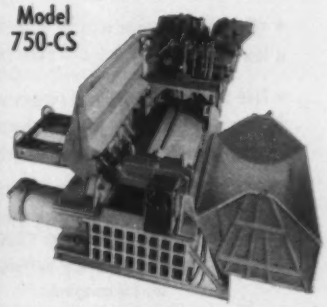


Model 2000

Model 350



Model 750-CS



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DEMPSTER BROTHERS Inc. KNOXVILLE 17, TENN. DEPT. S-7.

rotary drilling rigs in the week ended June 27 totaled 1771 vs. 1760 in the preceding week, and 2237 in the same week last year.

Stainless clad welded carbon steel tubing, in diameters up to 3¼ in. OD, and with composite wall thicknesses up to ¼ in., has been added by Standard Tube Co., Detroit, to its line. It serves in structural and ornamental applications for stanchions, railings, columns, handles, legs, and various other supporting elements.

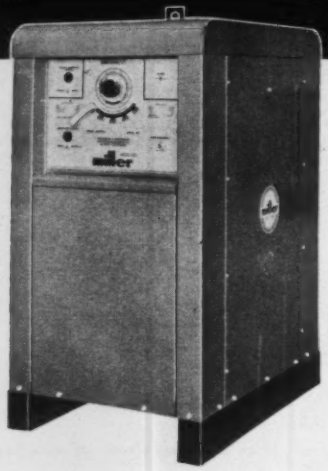
Japanese Building Items Get Preferential Rates

Special consideration has been accorded the movement of construction materials from Japan to Alaska, it's reported at Anchorage, Alaska. The Trans-Pacific Freight Conference is reported to have granted "open" rates until Sept. 30 when it will be determined whether to make them permanent.

The original tariff schedule provided rates from Japan to Alaska 30 per cent higher than from Japan to Pacific Coast ports. The preferential treatment is expected to be a boon to the construction industry in Alaska. It applies principally to bulk shipments of cement, iron and steel products (mostly wire, wire rods, pipe, and reinforcing bars, in lots of 1000 tons or more each).

NEW

BALANCED WAVE TIG WELDER DELIVERS DEEP, CLEAN "X-RAY" WELDS ON SHEET METAL or PLATE



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Barrel, Drum, and Pail Shipments Rise in April

Shipments of steel shipping barrels and drums in April totaled 2,483,379 units, 1 per cent above March shipments of 2,450,223 units but 19 per cent below shipments of 3,065,602 units in April, 1959. The movement during the first four months of this year amounted to 9,695,952 units vs. 11,117,203 in the like period last year.

Steel pail shipments in April amounted to 5,894,303 units, up 6 per cent from the March total of 5,584,168 but down 24 per cent from shipments of 7,723,823 units in April, 1959. Shipments during the first four months came to 22,033,773 units vs. 24,851,923 in the same period last year.

Reduces Plastics Prices

Lower prices for Lexan polycarbonate resins have been announced in advance of completion and start-up of General Electric's manufacturing facility at Mt. Vernon, Ind. The new prices reflect reductions of about 35 per cent.

Pig Iron . . .

Pig Iron Prices, Page 146

The remainder of this month will see reduced demand for pig iron and coke as many foundries close for the customary vacations. Activity in the following month will also be restricted since a few shops schedule their shutdowns for August.

Pipe shops in the Birmingham district are closing down for ten days or two weeks. Only a slight pickup in demand for iron is expected to develop in August.

Blast furnace operators are reducing operations due to the drop in orders. Republic Steel Corp. banked its second blast furnace at its Thomas Works in Birmingham, one furnace at Cleveland, and its facility at Troy, N. Y.

GE Cuts Prices on Fuses

Price reductions up to 60 per cent on General Electric's complete line of CLF high interrupting capacity fuses (used in industrial and commercial buildings) have been announced by the company's Low Voltage Switchgear Dept., Philadelphia. The department also initiated a new distributor stocking program which will enable the distributor to stock CLF fuses at competitive prices.

Plates . . .

Plate Prices, Page 139

Demand for plates is holding on the lower level that has prevailed in recent weeks. Inquiry shows little buoyancy, though shipwork appears a little more promising with the long strike ended. Little new ship tonnage is in sight, however. Chemical requirements seem to be holding up better than that from most other lines of consumption. That is reflected in demand for alloys and plate specialties, though tonnagewise, orders are small.

Orders entered for third quarter shipment are light. Inventories were tapped less than had been expected during May and June, and most fabricating shops still have ample stocks. Less plate tonnage is being estimated for fabricating, and profit margins are narrowing. Not until shipments extend more than two to three weeks on universal and sheared plates is forward buying likely to develop.

About 1500 tons of plates are involved in a pipe job at the Hanford Works. Also, an award of 1400 tons for Seattle's Tolt River water supply line is pending in the Pacific Northwest.

Fred J. Mayo, president, Ingalls Shipbuilding Corp., Pascagoula, Miss., says the company is apparently low bidder for construction of six cargo vessels to cost $62,649,840. The contract will be the first to be placed under the $4.5 billion long range U. S. cargo fleet replacement program.

Structural Shapes . . .

Structural Shape Prices, Page 139

Structural steel demand continues spotty. In some Eastern areas, a fair amount of work has been placed

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75% PAINT SAVINGS

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RANSBURG

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Write for information and literature about this revolutionary, new painting tool. See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. If your production justifies, it'll pay you to investigate Ransburg's *automatic* electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

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11A

recently, with active inquiry reasonably brisk. In others, however, demand is dull. Over-all, seaboard fabricators are still competing sharply for new business. They are all drawing on order backlogs to sustain operations.

In a series of alternate bids with prestressed concrete for the Cabin John Bridge, Potomac River, Maryland-Virginia, estimates on all-steel superstructure are low. The structure is an eight-span project. But prestressed concrete is making inroads in competition with fabricated structural steel for many jobs, notably where Japanese strand is permitted.

More bridge tonnage is being estimated in New England, the largest job being the Taunton River bridge superstructure, Somerset-Fall River, Mass., involving 500 tons of structurals.

Bids are in for an Oregon state project, the Willamette River bridge, involving 400 tons. The Carmen-Smith Dam project, Eugene, Oreg., and a number of public works jobs in Alaska will require structurals.

The City of Seattle plans to sell a two span, steel railroad bridge, 288 ft in length, weighing 262 tons. It's no longer needed for the city's Skagit River power project.

Ingalls Steel Construction Co., Birmingham, is apparent low bidder at $1,362,958 for construction of the superstructure for the $6 million Natchez Trace Parkway Bridge over the Tennessee River.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

834 tons, high school, Oshkosh, Wis., to C. Hennecke Co., Milwaukee; Hoffman & Co., Appleton, Wis., general contractor.

500 tons, high school, Bangor, Pa., through F. K. Campion Co., general contractor, to O'Neill Steel Co., near Philadelphia.

290 tons, Tapley post office annex, Springfield, Mass., to Haarmann Structural Steel Co., Holyoke, Mass.; Ley Construction Co., Springfield, Mass., general contractor.

250 tons, air control center, Auburn, Wash., to United Concrete Pipe Corp., Auburn; Baugh Construction Co., Seattle, general contractor at $1,468,490.

200 tons, bridge near Bonneville Dam, Oregon, to United Concrete Pipe Corp., Auburn, Wash.; Gibbons & Reed, Salt Lake City, Utah, general contractor.

173 tons, state bridgework, Orange County, New York, Kingston Crane Services and Folmer Nissen, low jointly on the general contract.

123 tons, Sheep Creek bridge, Alaska, to United Concrete Pipe Corp., Auburn, Wash.; Green Construction Co., Seattle, general contractor.

120 tons, cover for water reservoir, Tacoma, Wash., to unstated Tacoma fabricator.

110 tons, state bridgework, Saratoga County, New York, J. M. Gridley, Schenectady, N. Y., low on the general contract.

STRUCTURAL STEEL PENDING

1095 tons, seven state bridges and three reinforced concrete culverts, New Britain-Berlin, Conn.; A. J. Oriando Construction Co. Inc., Whitestone, N. Y., low on the general contract; also, 650 tons of concrete reinforcing bars, and 485 tons of steel piles.

580 tons, tower leg extensions, Garrison-Jamestown section, transmission division, Missouri River project, North Dakota; bids July 26, Bureau of Reclamation, Denver.

500 tons, bridge, State Highway & Bridge Authority, Cumberland County, Pennsylvania; bids July 29.

400 tons, Willamette River bridge, Oregon; S. & D. Construction Co., Portland, Oreg., low at $424,000.

350 tons, government-furnished, 28.1 mile, 345 kv transmission line, Douglas and Chelan counties, Washington State, involving 123 towers; general contract for erection to Pettijohn Engineering Co., Portland, Oreg., low at $461,658 to Bonneville Power Administration, Portland, Oreg.

200 tons or more, detour freeway bridges, Oregon, Multnomah County; Peter Kiewit Sons Co., Vancouver, Wash., low at $1,826,728.

100 tons or more, Mayfield Dam spillway and bridge; Pacific Coast Div., Bethlehem Steel Co., Seattle, low at $27,427 to the city of Tacoma, Wash.

100 tons, extension of airport concourse, Seattle; Brazier Construction Co., Seattle, low at $770,000 to the Port of Seattle.

100 tons or more, equipment storage building and truck nose stalls; bids to Alaska Railroad, Anchorage, Alaska, July 21.

Unstated, aerial tramways in Alaska; Tin City Air Base, S. S. Mullen Inc., Seattle, low bidder at $774,041; Ghemm Co., Fairbanks, Alaska, low at $523,850 at Lisburne Air Base.

Unstated, radar tower structure, Indian Mountain, Alaska; general contract to Peter Kiewit Sons Co. Inc., Seattle, low at $349,010.

Unstated, Eugene, Oreg., power project, McKenzie River; Kaiser Steel & Mfg. Co., gate hoists, $11,201; Schedule No. 2, Star Iron & Steel Co., Tacoma, Wash., low at $68,635, same bidder low at $67,900 for 75 ft stiffleg derrick.

PLATES . . .

PLATES PLACED

1500 tons, primary reactor loop piping, Hanford Works, Washington State, to joint contractors: Hoffman Construction Co., Portland, Oreg., University Plumbing & Heating Co., Seattle, and Industrial Contractors Co., Twin Falls, Idaho.

690 tons, hull, high tensile, pickled and painted, Navy Purchasing Office, Washington, to Penn Galvanizing Co. Inc., Philadelphia, at $164,341.

Unstated tonnage, standpipe, Holliston, Mass., to Chicago Bridge & Iron Co., Chicago.

Unstated tonnage, liquid oxygen storage tanks, U. S. Army Ordnance District, Birmingham, to Chicago Bridge & Iron Co., Chicago, at $250,005.

PLATES PENDING

684 tons, hull, grade M, Navy, General Stores Supply Office, Philadelphia; bids July 6; also, 50 tons of stainless sheets, bids July 7.

595 tons, hull, Navy, General Stores Supply Office, Philadelphia; bids July 8; also, 72 tons of stainless, bids July 11.

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C-F LIFTER
C-F Lifters, under one man operation, pick up, carry and unload more sheet steel tonnage per hour than any other method – and at lower cost per ton. Wide carrying angles hold sheets securely – won't damage high grade sheets; tong action insures safe carrying; fast opening and closing adjustments of Lifter jaws permit shifting from one size pack to another in seconds. C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons.
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500 tons or more, 1290 ft penstock; also liner plates, Eugene, Oreg., power project; Graver Tank & Mfg. Co., Provo, Utah, low at $292,958.

100 tons, elevated water storage tank and tower, Lewisburg, Pa.; bids July 18, to U. S. Penitentiary, Lewisburg, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

435 tons, also 140 tons of shapes, Idaho road bridges, to unstated interests.

265 tons, high school, Oshkosh, Wis., to Cook & Brown Lime Co., Oshkosh; Hollman & Co., Appleton, Wis., general contractor.

REINFORCING BARS PENDING

1620 tons, Capitol Hill section of freeway extension, Seattle; bids to Olympia, Wash., July 19.

700 tons, Washington State office buildings, Olympia, Wash., two projects; Wick Construction Co., Seattle, $1,935,000, and Dolph Jones, Tacoma, Wash., $1 million, apparently low.

250 tons, two 804 ft Idaho state highway spans, Snake River; bids to Boise, Idaho, July 19.

231 tons, state highway bridge, Allegheny County, Pennsylvania; bids July 22.

217 tons, state highway bridge, Morris County, New Jersey; bids July 21.

190 tons, Anchorage, Alaska, high school; H. S. Lease Co., Seattle, general contractor at $3,402,000.

100 tons, Washington State, Clark County road project; bids to Olympia, Wash., July 19.

100 tons, Marysville, Wash., junior high school; general contract to George E. Teufel Co., Seattle, at $231,223.

100 tons or more, six story science building, Washington State College, Pullman, Wash.; bids to the Board of Regents, July 22.

Unstated, parking garage, Tacoma, Wash.; bids July 6.

Unstated, Montana state, Jefferson River bridge; W. P. Roscoe Co., Billings, Mont., sole bidder at $149,802.

Unstated, Washington State freeway and underpass, Pierce County; general contract to Allen R. Anderson, Seattle, at $248,257.

Unstated, Oregon state highway projects, low bidders: Coos County, 732 ft span, Johnson & Bryant, Newberg, $238,666; Jackson County, Rogue River bridge, S. & D. Construction Co., Portland, Oreg., $174,000; Lane County, 563 ft bridge, Tom Lillebo, Reedsport, $162,325; Washington County, 210 ft span, Warren Northwest Inc., Portland, Oreg., $563,825, including paving.

PIPE . . .

CAST IRON PIPE PLACED

218 tons, 6, 8, and 12 in., Tacoma, Wash., awarded to Pacific States Cast Iron Pipe Co., Seattle.

148 tons, 6 and 8 in., King County District No. 42, Seattle, to U. S. Pipe & Foundry Co., Seattle.

108 tons, 6, 8, and 10 in., King County District No. 94, Seattle, and Mercer Island, Seattle, to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

818 tons, 4 to 12 in., for Auburn, Wash.; bids in July 5.

111 tons, 8 in.; bids in at Bremerton, Wash.

Unstated, Bothell, Milton, and Port Angeles, Wash.; bids in.

Unstated, also steel pipe, Capitol Hill section of Seattle freeway; bids to Olympia, Wash., July 19.

Iron Ore Statistics—May, 1960

Stocks of Iron Ore at Furnaces and Docks—May, 1960
(Gross tons)

	U. S. Ores		Canadian		Foreign	
At U. S. Furnaces	**L. Sup.**	**Other**	**L. Sup.**	**Other**	**Ores**	**—Total—**
Start of month	12,370,829	3,646,948	514,137	2,596,191	13,517,132	32,645,237
End of Month:						
Mass., N. Y.	1,581,454	52,565	41,076	97,374	314,345	2,086,814
Pennsylvania	4,462,981	345,349	28,969	153,494	5,823,543	10,814,336
Md., Va., W. Va.	54,208	8,588	.....	1,145,037	2,632,074	3,839,907
Ky., Tenn., Tex.	273,770	289,020	.....	202,130	105,410	870,330
Alabama	871	1,893,758	.....	129,208	3,377,262	5,401,099
Ohio	3,933,193	34,103	319,995	1,138,049	896,938	6,322,278
Indiana	3,679,742	2,420	200,205	.....	59,105	3,941,472
Illinois	1,977,393	30,814	12,597	.....	187,773	2,208,577
Mich., Minn.	1,953,410	.....	59,049	33,554	166,262	2,212,275
Col., Utah, Calif.	.....	1,092,368	.....	.....	37,234	1,129,602
Undistributed	442	2,849	.....	.....	500	3,791
End of Month	17,917,464	3,751,834	661,891	2,898,846	13,600,446	38,830,481
At U. S. Docks	1,532,837	.....	82,877	919,067	1,890,176	4,424,957
Total U. S. Stocks	19,450,301	3,751,834	744,768	3,817,913	15,490,622	43,255,438
At Canada Furnaces:						
Start of Month	786,707	.....	119,675	248,622	5,066	1,160,070
End of Month	1,218,030	.....	124,432	253,640	17,118	1,613,220
Total U. S.-Canada	20,668,331	3,751,834	869,200	4,071,553	15,507,740	44,868,658

Consumption of Iron Ore in U. S. and Canada—May, 1960
(Gross Tons)

	U. S. Ores		Canadian		Foreign	
In U. S.:	**L. Sup.**	**Other**	**L. Sup.**	**Other**	**Ores**	**—Total—**
Mass., New York	455,255	47,289	24,293	33,784	37,784	597,925
Pennsylvania	1,000,913	215,488	2,652	87,365	1,073,464	2,379,882
Md., Va., W. Va.	90,187	38,188	10,720	291,737	477,542	908,374
Ky., Tenn., Tex.	39,001	100,049	.....	39,022	61,335	239,407
Alabama	.....	386,892	.....	.....	191,760	578,652
Ohio	1,114,143	47,501	49,349	259,916	212,836	1,683,745
Indiana	1,277,184	445	105,369	.....	32,765	1,415,763
Illinois	636,994	18,183	5,141	.....	52,983	713,301
Mich., Minn.	574,273	.....	60,873	.....	65,512	700,658
Col., Utah, Calif.	.....	514,438	.....	.....	8,054	522,492
Undistributed	76	124	.....	.....	5	205
In U. S.						
Blast furnaces	3,368,691	805,619	141,120	391,986	704,382	5,411,798
Steel furnaces	106,948	58,153	16,877	941	511,106	694,025
Sintering	1,712,300	504,807	100,400	318,897	998,072	3,634,476
Miscellaneous	87	18	.....	.....	.....	105
Total U. S.	5,188,026	1,368,597	258,397	711,824	2,213,560	9,740,404
In Canada:						
Blast furnaces	251,152	.....	93,054	107,113	.....	451,319
Steel furnaces	4,461	.....	.....	20,885	10,179	35,525
Sintering	55,728	.....	23,048	29,435	.....	108,211
Miscellaneous	16	.....	.....	.....	.....	16
Total Canada	311,357	.....	116,102	157,433	10,179	595,071
Total U. S. & Canada	5,499,383	1,368,597	374,499	869,257	2,223,739	10,335,475

Data from American Iron Ore Association.

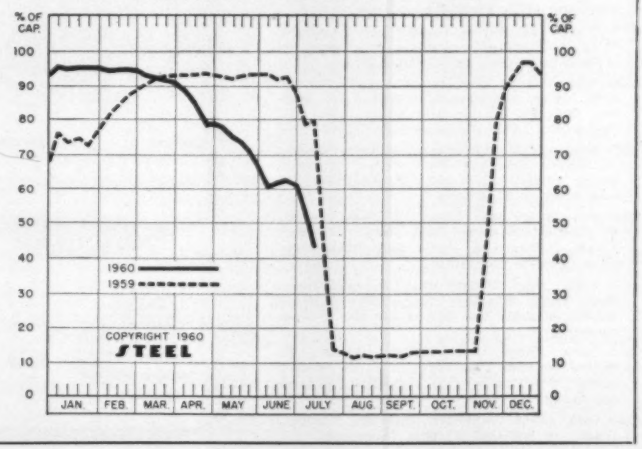
DISTRICT INGOT RATES

(Percentage of capacity utilized)

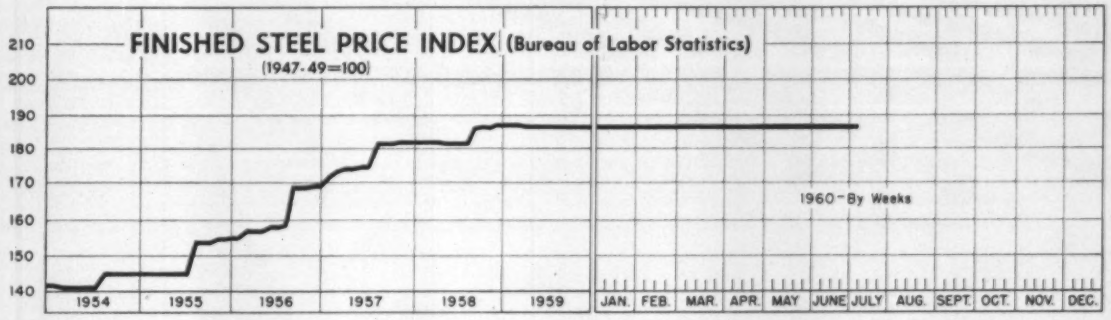
	Week Ended July 10	Week Ago	Month Ago	Year Ago
Northeastern	51	58	65	80
Buffalo	47	60	61	86
Pittsburgh	35	46	61	80
Youngstown	13	40	39	73
Cleveland	42	57	67	74
Detroit	70	82	79	80
Chicago	48	52	64	87
Cincinnati	29	47	64	85
St. Louis	56	60	77	81
Southern	50	56	62	78
Western	62	62	69	68
Total Industry	42.7	53.0	61.6	79.5
Index (1947-49=100)	75.8	94.0	109.3	140.2
Net Tons (In thousands)	1,218	1,510	1,756	2,252

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



July 5, 1960	Week Ago	Month Ago	June Index	Year Ago
186.6	186.6	186.6	186.6	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.767
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.585
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed(80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	20.003

STEEL'S FINISHED PRICE INDEX*

	July 6 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	207.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.625

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$126.64
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	31.33	31.33	31.33	38.00	37.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	July 6 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.317
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35-6.45
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin plate (1.50 lb)box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-5/8" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton

	July 6 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	56.16
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

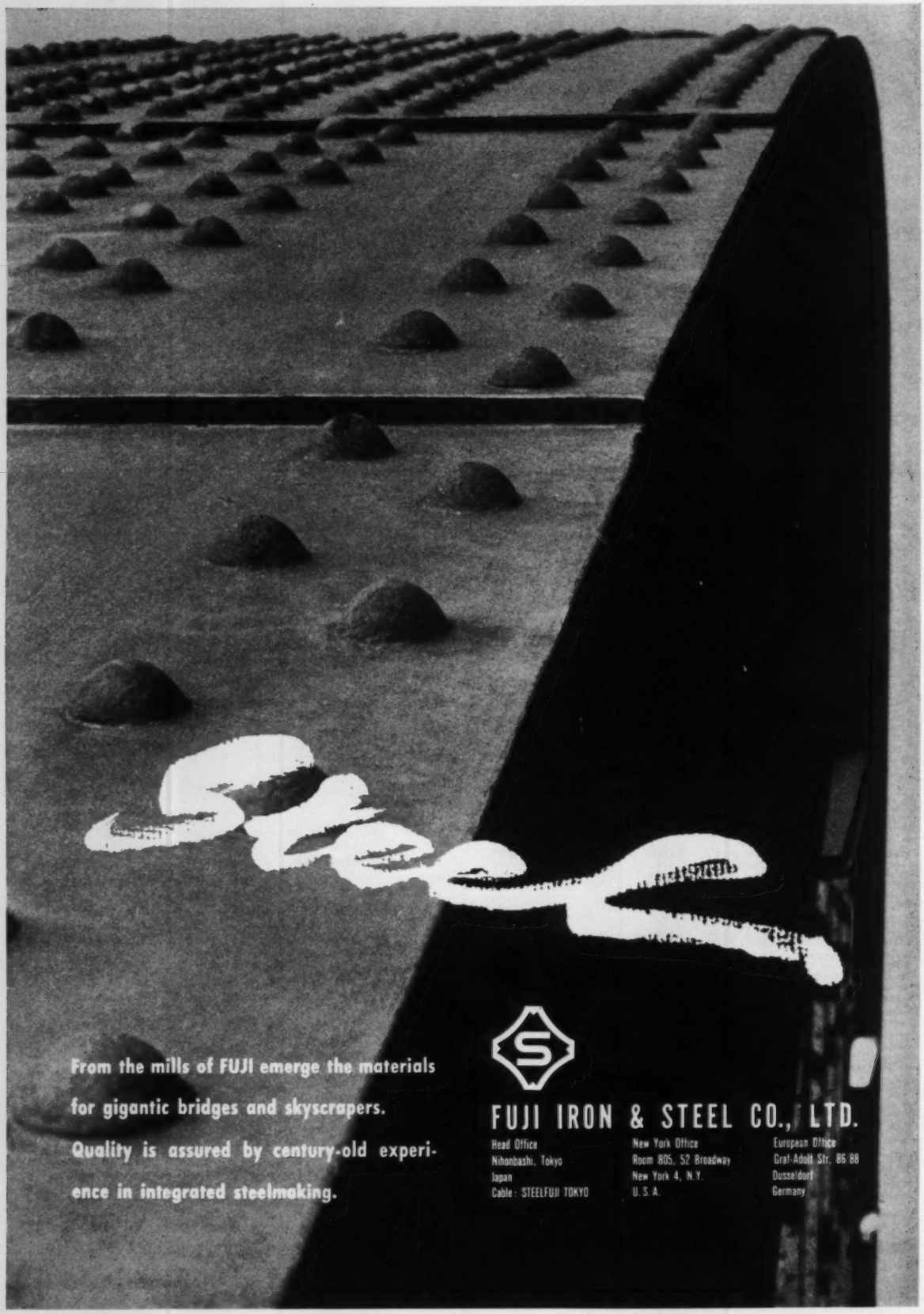
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$30.50	$39.50	$38.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	34.00	38.00	39.00
No. 1 Heavy Melt, Chicago	29.50	29.50	29.50	36.50	36.00
No. 1 Heavy Melt, Valley	32.50	32.50	32.50	41.50	37.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	35.00
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	33.50	29.50
Rails, Rerolling, Chicago	49.50	49.50	49.50	59.50	55.50
No. 1 Cast, Chicago	40.50	40.50	42.50	52.50	43.50

COKE, Net Ton

Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25



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New York Office
Room 805, 52 Broadway
New York 4, N.Y.
U.S.A.

European Office
Graf-Adolf Str. 86/88
Dusseldorf
Germany

Steel Prices

Mill prices as reported to STEEL, July 6, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 140, footnotes, page 142.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14.....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ..119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 ....122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburg J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Jonhstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburgh,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill.U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide-Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ...6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ....5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ...9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind.J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025

Warren,O. C17 .....9.025
Waukegan, Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex. (26) T4 5.25
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ...5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.65
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill. (8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6 275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W.Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2..5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2 M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 .....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10..7.875
NewBritain,Conn. S15 ..7.875
NewCastle,Pa. B4, M22..7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6 .7.425
Pawtucket,R.I. R3, N8..7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M22 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren O. B9, S3, T5 .7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harbor Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ..8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill. (1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ..13.45
Portsmouth,O. P12 ....12.65
Roebling, N.J. R5 ....12.95
SparrowsPt.,Md. B2 ..13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ..12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown Pa. B2 .....9.75
KansasCity,Mo. S5, U3..10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 ...10.05
Pittsburg Calif. C11 ..10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7, J4, T6 10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3..10.00
LosAngeles B3 .....10.70
Millbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.70
Portsmouth O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....10.70
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity Mo. S5 ....16.55
Kokomo,Ind. C16 ....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 ....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 ....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	*173*
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	*173*
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	*9.02*
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	*9.30*
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	*9.35*
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	*212*
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190‡
Atlanta A11	*197**
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190‡
Atlanta A11	*191**
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‡
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	.9.00	9.55**
Aliquippa J5	8.65	9.325‡
Atlanta(48) A11	*9.00*	*9.75**
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675‡
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)B5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625‡
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35‡
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775‡
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. ‡10c. ‡‡Less **Subject to zinc equaliza- than 10c. ††10.50c. ‡‡11.00c. tion extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1¾ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter: Packages	+5
Bulk	+19
Through 1 in. diam., longer than 6 in.: Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ⅛ in., larger 12.85 ⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.96
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

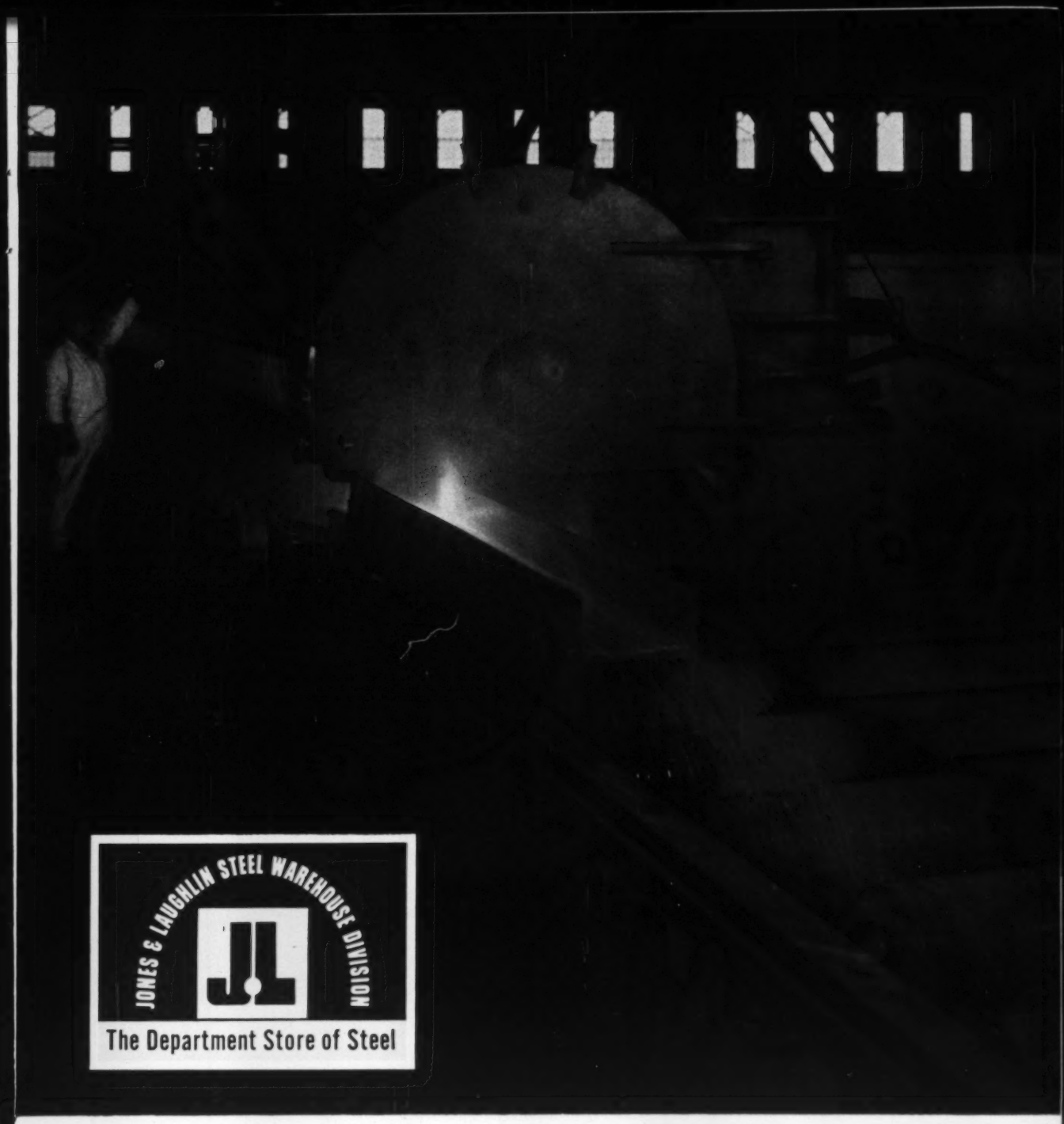
Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 80" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.



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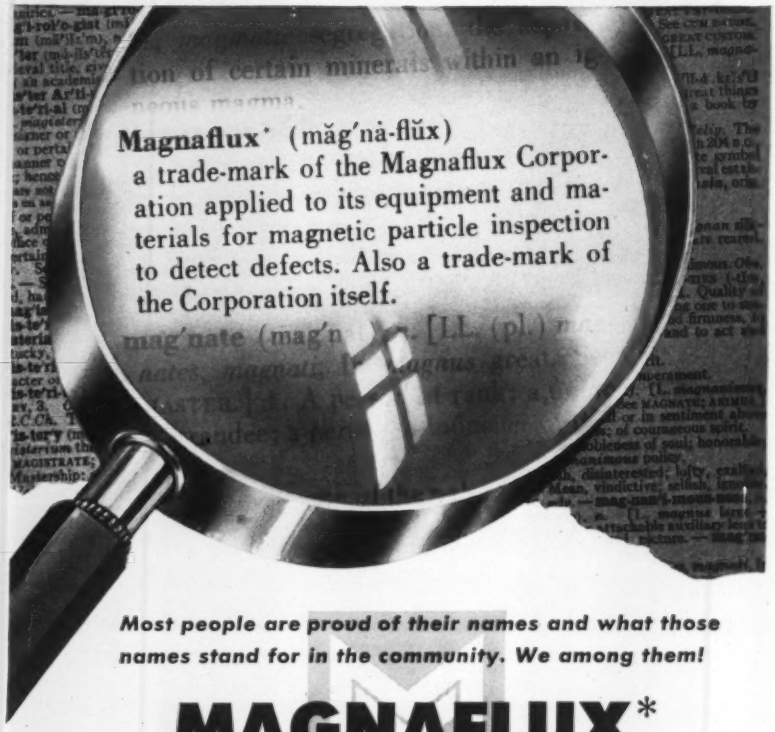
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MAGNAFLUX CORPORATION

General Mills

TEST SYSTEMS

*Registered U. S. Patent Office

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Sweepo Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk. (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.495
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	7.32	10.20	10.95	52.00	8.34	7.95	10.65	15.95	7.91	7.51	10.13
Cincinnati	8.91	10.26	11.00	65.30	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	7.32	9.88	11.14	56.18	8.46	8.16	11.25	16.06	8.30	7.75	10.37
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	57.60	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
Moline, Ill.	9.24	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	9.60	10.66	52.71	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	7.32	9.88	11.03	52.00	8.44	7.95	11.25	15.95	7.91	7.51	10.13
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.84	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	55.10	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	56.52	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.92	11.29	11.90	56.52	11.69	9.81	16.20	17.80	10.44	10.02	12.31

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅜ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon, Forging Quality (net ton) $97.00
Alloy (net ton) 115.00

Wire Rods:
Carbon ⅜" to under ¼ in. 5.30
Carbon, ¼ in. to 47/64 in. 5.70
Alloy 6.40

Wire (Carload lots) 8.40

Bars & Small Shapes:
Carbon, merchant quality 5.40
Carbon, special quality 5.85
Alloy 6.40

Bar Mill Bands:
Carbon 5.40
Alloy 8.05

Structural Size Angles & Zees 5.40

Plates:
Carbon 5.45

Sheets & Coils, Hot Rolled:
Carbon Sheets 5.00
Carbon Strip 5.00

Sheets & Coils, Cold Rolled:
Carbon Sheets 6.35
Carbon Strip (0.080 and lighter) 6.35
Carbon Strip (0.081 and heavier) 6.65

Sheets & Coils, Galvanized:
Standard Quality 6.70
Culvert Quality 7.00

Sheets, Porcelain Enameling 7.45

Sheets & Coils, Electrical:
Field Grade 9.00
Armature Grade 9.50
Electrical Grade 10.15

Tin Mill Products (Per Base Box; 100 lb basis wt)
Coke Tin Plate (1.25 lb pot yield) $10.60
Electrolytic Tin Plate (0.25 lb coating) 9.10
Black Plate 8.30

Nails, c.l. lots (per keg) 400 keg min. $8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe, ton, del. east of Mississippi.	36.75
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, $8.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 39.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	40.90
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 72-75%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (‡)	8.50	7.40	7.40	7.25	7.65

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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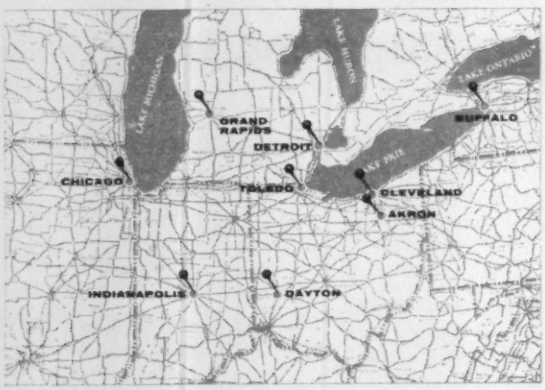

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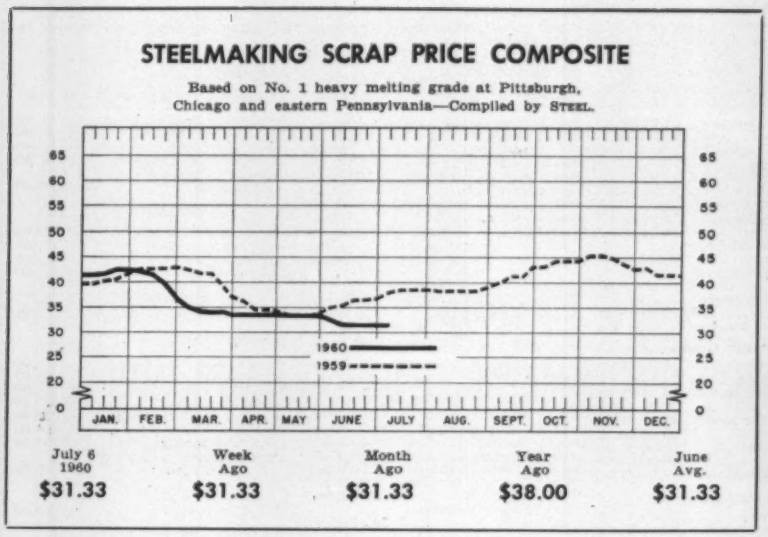

Scrap Is Resisting Further Decline

STEEL's composite on No. 1 heavy melting steel holds unchanged at $31.33 for the fifth straight week. Market activity limited with steel ingot rate off sharply

Scrap Prices, Page 152

● **Pittsburgh**—With local steelmaking operations at the lowest level of the year (36 per cent of capacity), the scrap market is dull. Brokers for a mill on the edge of the district paid dealers $31 a ton, delivered, for No. 1 heavy melting and $26 a ton for No. 2 heavy melting. Since last month's prices were the same, trade sources are encouraged to believe that the market has hit bottom.

● **Chicago** — The market here is static, both as to buying activity and prices. With the steelmaking rate at 45 per cent of capacity (several mills extended shutdowns beyond the holiday weekend), there is little interest in scrap. The meager commitments being made are largely for building inventories at attractive prices rather than for immediate consumption.

Promoting price stability at the moment was announcement by a large mill that its July buying price for No. 1 industrial heavy melting will be unchanged at $31 a ton. However, that mill limits its purchases to return scrap from its customers.

Bids on a list of 5000 tons of industrial bundles to be produced by an auto stamping plant were $35.42 delivered Chicago. A month ago, the bid was $35. Slightly lower was the bid on the 9000 ton list of another stamper. The mills maintain that they can get all of that grade they wish to buy at $35 a ton.

● **Philadelphia** — While prices on steel scrap are unchanged, the market on cast iron grades is easier. No. 1 cupola is off $1 to $40, delivered. Heavy breakable is down $2 to $38, and drop broken machinery 50 cents to $51. Malleable is unchanged. Domestic demand is spotty.

● **New York**—Brokers' buying prices are unchanged, but the market is soft, reflecting the continued lag in domestic consumption.

● **Boston** — Brokers have lowered their buying prices on prime heavy melting steel grades $1 a ton, and $2 on No. 2 heavy melting. Steel scrap prices are now the lowest since the mid-'30s, with domestic buying at a standstill. Yards have substantial stocks of No. 1 bundles.

The railroad freight rate on scrap from Groveton, N. H., to Boston has been reduced $1.90 a gross ton, rates applying on traffic interchanged direct between rail and water carriers.

● **Cleveland**—The market is weak here and in the Valley, with steelmaking operations at both points at the lowest levels of the year. The Cleveland area ingot rate last week fell 15 points to 42 per cent of capacity, while the Valley rate dropped 27 points to 13 per cent. Little steel scrap is moving, although prices quoted are more attractive than at any time in the last six years. Lacking a buying test, current prices on the steel grades are nominal. The cast iron grades are also moving slowly, with many foundries closed for mass vacations.

● **Buffalo**—Prices on No. 1 heavy melting and other No. 1 steel grades are off $1 a ton. No. 1 heavy melting is now quoted $29-$30. Turnings have been reduced $2 a ton and are now $12-$13, with short shoveling $17-$18. Low phos and railroad scrap are down $1. Dealers say No. 2 steel will be price-tested early this month when new mill orders are placed.

● **Detroit**—The market has continued slow since the auto lists went at prices off $1 to $2 a ton from a month ago. A nominal order for bundles at $29, delivered, is out from the Great Lakes Steel Corp.

● **Cincinnati**—While prices on the principal steelmaking grades are unchanged, only limited tonnage buying is being done. No. 1 heavy melting steel continues to be quoted

(*Please turn to Page* 157)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, July 6, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 6	$31.33
June 29	31.33
June Avg.	31.33
July 1959	38.45
July 1955	39.67

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	35.00-36.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	18.00-19.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	37.00-38.00
3 ft and under	36.00-37.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	*34.00-35.00*
Unstripped motor blocks	*25.00-26.00*
Clean auto cast	37.00-38.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 2 ft and under	51.00-52.00
Rails, 18 in. and under	52.00-53.00
Random rails	45.00-46.00
Angles, splice bars	45.00-46.00
Railroad specialties	46.00-47.00
Rails, rerolling	51.00-52.00

Stainless Steel Scrap

18-8 bundles & solids	200.00-205.00†
18-8 turnings	100.00-105.00†
430 bundles & solids	100.00-105.00†
430 turnings	50.00-55.00†

CHICAGO

No. 1 hvy melt., indus.	30.00-31.00
No. 1 hvy melt., dealer	28.00-29.00
No. 2 hvy melting	25.00-26.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	30.00-31.00
No. 1 busheling, dealer	28.00-29.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	34.00-35.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	45.00-46.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	44.00-45.00
Rails, 2 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Angles, splice bars	40.00-41.00
Axles	49.00-50.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles, solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	24.00-25.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00†
No. 2 heavy melting	23.00-24.00†
No. 1 factory bundles	32.00-33.00
No. 1 bundles	31.00-32.00†
No. 2 bundles	17.00-18.00†
No. 1 busheling	31.00-32.00†
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00†
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	33.00-34.00†
No. 1 bundles	33.00-34.00†
No. 2 bundles	20.00-21.00†
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00

BUFFALO

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	25.00-26.00
No. 1 bundles	*29.00-30.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	*29.00-30.00*
Shovel turnings	*17.00-18.00*
Machine shop turnings	*12.00-13.00*
Cast iron borings	*15.00-16.00*
Low phos. structurals and plate, 2 ft and under	*40.00-41.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	*43.00-44.00*
Rails, 3 ft and under	*49.00-50.00*
Railroad specialties	*40.00-41.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable cast	32.00-33.00
Charging box cast	36.00-37.00
Drop broken machinery	*48.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	*51.00-52.00*
Rails, random lengths	*44.00-45.00*

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	20.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	56.00-57.00

Cast Iron Grades

No. 1 cupola	*40.00*
Heavy breakable cast	*38.00*
Drop broken machinery	*51.00*
Malleable	51.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips solids	165.00-170.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*24.00-24.50*
No. 2 heavy melting	*19.00-20.00*
No. 1 bundles	*24.00-24.50*
No. 1 busheling	*24.00-24.50*
Machine shop turnings	6.00-7.00
Shovel turnings	9.00-10.00
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	28.00-29.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	9.00-10.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	36.00-37.00
Structurals & plate	35.00-36.00
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	*31.00-32.00*
2 ft and under	33.00-34.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	46.00-47.00
Unstripped motor blocks	36.00-37.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	9.00†
Shovel turnings	11.00†

Cast Iron Grades

No. 1 cupola	44.00†
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	35.00†
Clean auto cast	45.00†
Stove plate	36.00†

Railroad Scrap

No. 1 R.R. heavy melt.	31.00†
Rails, random lengths	38.00†
Rails, rerolling	50.00†
Rails, 18 in. and under	41.00†
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	12.00-12.50
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	37.00
No. 2 heavy melting	34.00
No. 1 bundles	35.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Shovel turnings	18.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	42.00

Cast Iron Grades

No. 1 cupola	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-34.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	30.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	34.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy. melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

"BACKBREAKERS" wiped out by Budgit® Chain Blocks

Budgit Aluminum Army Type Chain Block. Integral push and hand-geared trolleys are adjustable to fit I-beams in a number of sizes. Low head-room design. Capacities: ¼ to 10 tons.
Budgit Aluminum Chain Block. Light in weight but tough. Can be carried to the job, hung up and operated by one man. Spark and corrosion resistant models. Capacities: ¼ to 2 tons. Hi-Cap* models from 3 to 10 tons.
Budgit Differential Hoist. Low-priced lifting tool for occasional use where high efficiency isn't essential. Light and compact. Capacities: ¼, ½ and 1 ton.
Tugit* Lever-Operated Hoist. Light, compact, portable. Easy to operate even in close quarters at any angle. Fine for maintenance. Capacities: ¼ to 3 tons.

Eliminate tough lifting and plant maintenance ceases to be a costly muscle-aching job. A large midwestern heavy machinery manufacturer found this only too true. So now Budgit Aluminum Chain Blocks in various capacities are proving to be the perfect answer to countless lifting problems.

These lightweight hoists are easy to get to the job — easy to rig and operate at any angle. These features alone have won wide favor among the maintenance men. For instance, troublesome occasional jobs — repairing furnaces, dismantling machinery, handling large pipe, motors or valves — demand shifting as well as lifting.

Budgit Chain Blocks are also solving handling problems at numerous metalworking machines. Here the number of lifts per day are few but accurate "spotting" of heavy loads is now being done without backbreaking hand chain pull.

Backsaving Budgit Chain Blocks can cut your maintenance costs and also boost your production efficiency. Ask your nearby Shaw-Box Distributors to help you select the types and capacities best suited to your needs. Or write for Bulletin 15025-1C.

*REGISTERED TRADENAMES 60 C-1

BUDGIT CHAIN BLOCKS
A product of
MANNING, MAXWELL & MOORE, INC.
Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Brass Mills Bank on Better 2nd Half

BRASS MILLS are banking on the fourth quarter to salvage what so far has been a pretty grim year. Yet, even the most optimistic industry spokesmen pretty generally agree that a strong fourth quarter won't be enough to keep sales from sliding under the 1959 level.

• **Down 15 Per Cent** — Through the first half, industry sales were off 15 per cent from last year's. Little improvement is expected until the fall months. Now is the normal slack time for the mills as most shut down during July for two week summer vacations. The few reports of a slight improvement in business among the mills polled by STEEL are more than offset by those reporting no noticeable sales uptrend. In a few instances, even a further drop from the second quarter level was reported.

On the expected strength of the fourth quarter, mill officials, without an exception, are forecasting a better second half. Even so, look for sales to show a pretty hefty drop from last year's 1.9 billion lb.

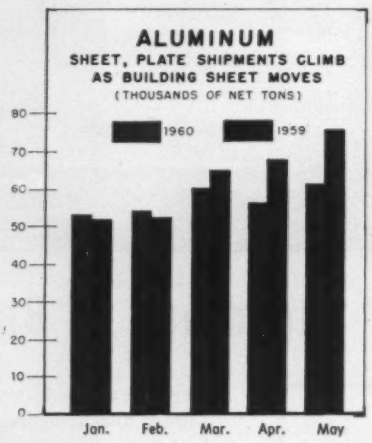
• **What's Wrong**—The mills themselves admit they can't determine where to pin the exact blame for the sales drop. You'll hear both imports and the dip in the construction market mentioned as contributing causes. One big factor is undoubtedly the heavy workoff of the large stocks built up prior to and during the copper strike. As one sales vice president puts it: "The pot just isn't boiling in a great many places." He believes, as do some of the other mill spokesmen, that "a lot more is wrong with the economy than most people think."

• **Profits Down More**—Adding to the disappointment over how badly the "Soaring Sixies" started out, is the bitter knowledge that profits will be off even more than sales.

Continued heavy foreign competition at a time when domestic sales are down has sparked reductions in both list prices and quantity discounts.

Metals Bills Held Over

In the last minute surge of business before adjournment for the nominating conventions, Congress failed to settle the fate of the two lead-zinc bills—the House-passed Edmondson Bill for small producers and the Kerr Amendment for subsidy payments to both large and small producers (see STEEL, July 4, p. 112). Early action on both bills is expected when Congress reconvenes later this summer.



Source: Aluminum Association.

In the Markets

• **Downgrade Aluminum Forecast** —Striking a much less optimistic tone than in earlier forecasts, the latest Business & Defense Services Administration projection of the 1960 aluminum market finds: 1. Shipments should about equal the peak of 2.5 million tons set last year. (Industry sources still believe business might be a little better—perhaps up 5 per cent from last year.) Primary production should set an all-time high of 2.1 million tons, up 7.5 per cent from the previous record of 1,953,017 tons, set last year.

• **Brass Ingots Lag** — The market for brass and bronze ingots continues to be anemic. Shipments in May slumped to 19,885 tons, bringing the total for the first five months to 109,354 tons. That compares with 121,983 a year earlier.

• **Magnet Wire Cut** — Unofficial price cutting in magnet wire over the last several months has led manufacturers to officially reduce prices by 6 to 12 per cent. Magnet wire is used principally by the electric equipment industry in the fabrication of coils and motor and transformer windings.

NONFERROUS PRICE RECORD

	July 6 Price	Last Change	Previous Price	June Avg	May Avg	July, 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.000	33.000	30.048
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.75	July 6, 1960	102.50	101.394	99.570	102.298
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Where maximum cleanliness is a "must"... EXLO® "75" Extra high in chromium and extra low in carbon, EXLO "75" is specially designed for use in very low-carbon stainless steels and heat-resistant alloys. There are two grades to choose from—.015% max. carbon and .025% max. carbon—both of which contain a minimum of 75% chromium. Because of its exceptional cleanliness, EXLO "75" is particularly adaptable to vacuum melting and other processes requiring minimum contaminant elements.

And don't forget the EXLO Standard Grades for use in low-carbon stainless and heat-resistant steels, irons and alloys. Like all EXLO ferrochromium alloys, they have high density and maximum cleanliness. Write for information or call your nearest VCA District Office. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N.Y. · Chicago · Cleveland · Detroit · Pittsburgh.

VANADIUM CORPORATION OF AMERICA

Producers of alloys, metals and chemicals

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intristic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l, 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 102.75; prompt, 102.625.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-24.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l, 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft				
Diam.	——Round——		——Hexagonal——	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy Ends	Rod Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000 28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250 20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500 24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500 25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500 26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625 19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625 20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500 20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125 27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625 14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625 28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.50; light copper, 22.00; refinery brass (60% copper) dry copper content, 22.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.50; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.50; yellow brass turnings, 14.00; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,00 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 5 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 151)

at $26.50-$27.50, brokers' buying price.

• **St. Louis**—The market continues inactive, but prices are unchanged. Suspensions for mass vacations have slowed sales. The largest district buyer is taking only small tonnages of selected items from regular suppliers.

• **Birmingham**—Although the market is soft, prices continue unchanged though they lack a test in the absence of new buying. Dealers expect some big orders this month, but over-all volume for the period will probably be limited.

• **Seattle**—The market continues in the doldrums. Little tonnage is moving due to reduced steel mill operations and heavy inventories. Some export shipments are being assembled at tidewater. Receipts from the country districts are below normal, reflecting resistance to the unattractive prices now prevailing.

• **San Francisco**—Steel scrap prices are firm despite the sluggish mill demand. No change in quotations is anticipated this month.

Scrap Use Slips in April And Users' Stocks Rise

Consumption of purchased iron and steel scrap by the steel mills and foundries during April declined an estimated 16 per cent from the March level, reports the Institute of Scrap Iron & Steel Inc. Consumption totaled 2,187,000 gross tons vs. 2,599,000 in March and 2,743,000 in April, 1959.

In the period, steel ingot production declined from 91.6 per cent of capacity to 80.1 per cent.

Scrap receipts by all consumers in April totaled 2,184,000 tons in contrast to the March level of 2,507,000.

The Scrap Institute estimated that the steel mills consumed 4,532,000 tons of home and purchased scrap in April vs. 5,402,000 tons in March. Foundries are estimated to have melted 1,095,000 tons in the month against 1,259,000 in March.

Steel mill stocks of home and purchased scrap increased slightly to 6,845,000 tons, while foundry stocks declined to 1,432,000 tons. Receipts of No. 2 bundles increased slightly to 252,000 tons vs. 249,000 in March.

In April, 456,000 tons of scrap were exported, down slightly from the 483,000 tons moved out of the country in the preceding month.

Iron Ore . . .

Cleveland-Cliffs Iron Co., Cleveland, plans expansion of production of high grade pellets from low grade iron ore at the Republic Mine, Republic, Mich. The facilities are the properties of the Marquette Iron Mining Co., owned by Cleveland-Cliffs, Jones & Laughlin Steel Corp., International Harvester Co., and Wheeling Steel Corp., and operated by Cleveland-Cliffs.

The plant will be expanded by 900,000 tons annual capacity to a total of 1,600,000 tons. Half the product of the Republic Mine will average 64.5 per cent iron and will be processed into pellets through the new facilities at the plant. The balance will be 62 per cent iron, and will be pelletized by existing Eagle Mills pelletizing facilities.

CLASSIFIED

FOR SALE
DIRECT ARC MELTING FURNACES
COMPLETE INSTALLATIONS

LECTROMELT—SIZE "S" 1000#/Hr. Rating Door Charge, 500 KVA Transformer 25,000 V Primary, Controls, Switchgear and Spares.

LECTROMELT—SIZE "U" 250#/Hr. Rating Door Charge, 300 KVA Transformer 25,000 V Primary, Controls, Switchgear and Spares.

Reply Box 859, STEEL
Penton Bldg. Cleveland 13, Ohio

MOTORS • GENERATORS • TRANSFORMERS
ELECTRIC EQUIPMENT CO.
World's Largest Inventory
Call collect: GL 3-6783
P. O. Box 51 Rochester 1, N. Y.

Help Wanted

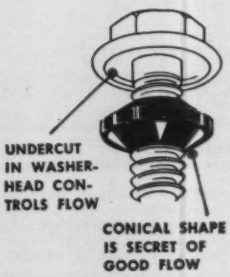
Established West Coast firm wants general superintendent with adequate experience in all phases of bar mill operations including operation of electric furnace. Submit full resume, salary expected to Box 860, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind.
Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.

One of the outstanding advantages of Townsend Tuff Tite fasteners is that they provide an economical means for leakproof joining of metal, asbestos, porcelain or plastic. The pre-assembled conical neoprene washers flow into the holes as the fasteners are seated, filling them and making waterproof seals. Tuff Tites are effective for any application requiring leakproof joints, such as those needed in the construction or appliance industries.

Tuff Tite advantages include ease and economy of installation, surface protection and vibration resistance. Standard items are immediately available from jobbers and warehouses. Tuff Tites are also available in numerous special designs to suit any application need.

If you are joining metal, plastic, porcelain or asbestos, you should know about Townsend Tuff Tites. Ask your Townsend representative, or we will send you complete literature. Townsend Company, Engineered Fasteners Division, P.O. Box 71-C, Ellwood City, Pa.



Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

ELLWOOD CITY · PENNSYLVANIA

Cherry Rivet Division · Santa Ana, California

In Canada: Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario

J. H. Pomeroy & Co. and Bechtel Corp., both of San Francisco, have been awarded a contract by the Columbia-Geneva Steel Div., U. S. Steel Corp., San Francisco, for partial construction of a taconite iron ore mining and beneficiation facility in Wyoming's Wind River Mountains.

Shipments of Lake Superior iron ore in June totaled 12,038,328 gross tons vs. 12,987,302 in June a year ago, reports the American Iron Ore Association. Of the month's total, 11,326,411 tons were shipped from U. S. lake ports, 711,917 tons from Canadian ports.

The movement in the 1960 lake shipping season to the end of June was 30,200,583 gross tons, up 1,468,050 tons from the 28,732,533 moved in the like period of the 1959 shipping season.

Iron Ore Stocks Increase With Fewer Stacks Active

Stocks of iron ore in the U. S. and Canada at the end of May totaled 44,868,658 gross tons vs. 42,551,064 at the end of May a year ago, reports the American Iron Ore Association. Of the total, 43,255,438 tons were in U. S. inventories, and 1,613,220 in Canadian (for breakdown on the basis of supply sources see table on page 136).

Consumption in May amounted to 10,335,475 tons vs. 12,423,008 in May last year. Of the total, 9,740,404 tons were consumed in the U. S. vs. 11,848,410 a year ago, and 595,071 tons vs. 574,598 in May 1959, in Canada (see page 136). Total consumption this year to date was 58,090,786 tons, compared with 57,109,688 in the same period last year.

Reflecting the contraction in iron and steel operations, only 184 blast furnaces were operating in the U. S. and Canada on the last day of May.

Transships Manganese Ore

Aluminium Ltd. announces that Chaguaramas Terminals Ltd., its bauxite transshipment station in Trinadad, has completed long term arrangements with Union Carbide Corp. for the handling of manganese ore shipped from British Guiana to North America via Trinidad. Well over 100,000 tons of manganese ore are expected to move through Chaguaramas annually from British Guiana.

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You May Win $1000 By Reading This Issue of STEEL

See Page 6 Servicenter For Details

STEEL's Big Usership-Idea of-the-Month Contest

No Boxtops No Jingles

Just tell us how you use articles or advertisements that you see in STEEL

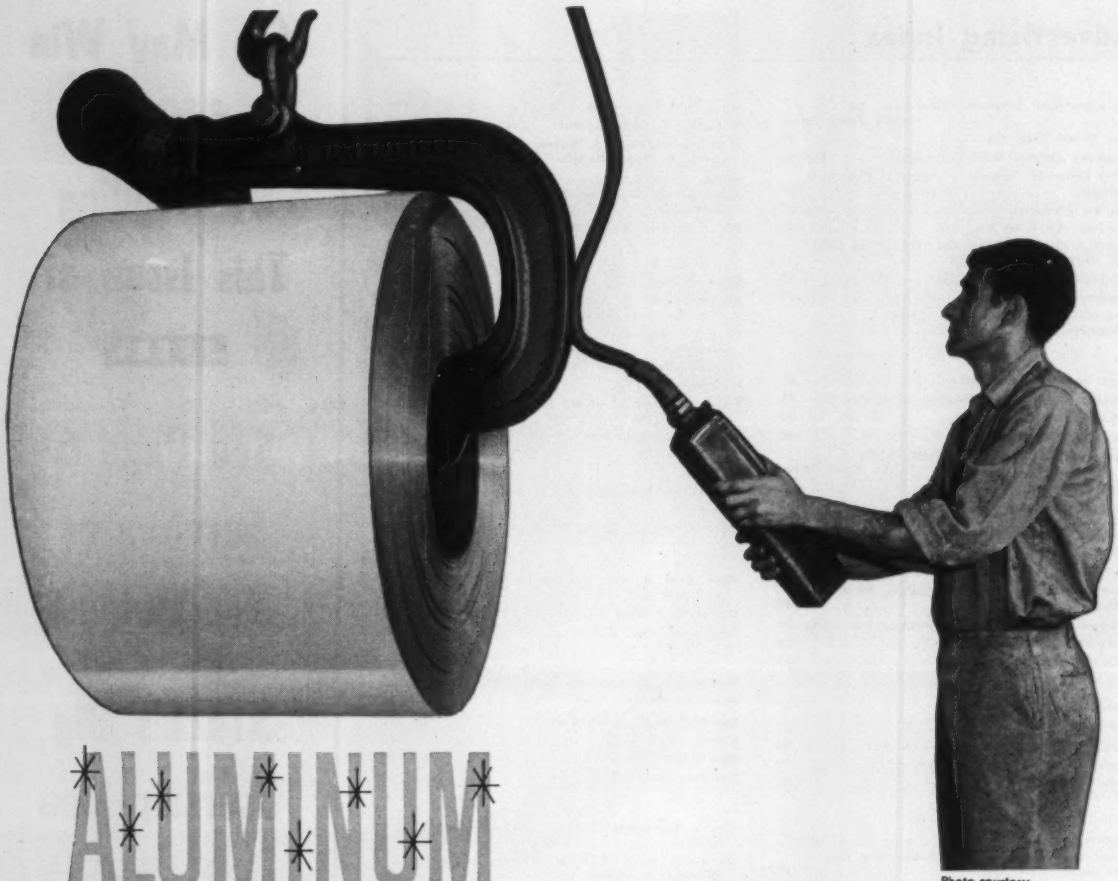


Photo courtesy
LITHO-STRIP CORP.

ALUMINUM

Bonderized and painted coil...

a revolution in product quality and performance

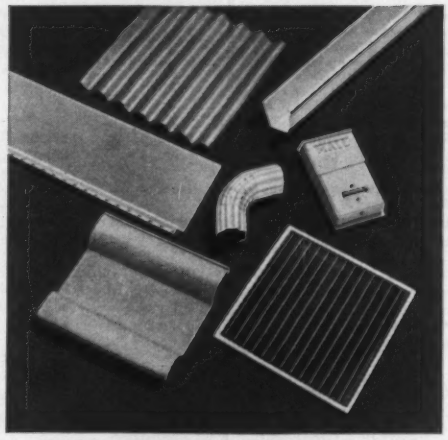
Bare aluminum enters the finishing installation and is cleaned, Bonderized and roll coat painted in continuous automated operation. Re-coiled, it's ready for forming into any one of dozens of products.

This is the most efficient, effective and economical method for painting aluminum. Straight-line production is utilized, labor and material costs are reduced, quality is maintained and the performance of the finish is spectacularly increased.

Paint adhesion over the Bonderite coating is so strong that it permits the most severe forming operations without peeling or failure.

Service life of paint over Bonderized aluminum—5 to 10 times that on untreated aluminum—assures product performance and customer satisfaction.

Aluminum, Bonderized and painted in the strip, is being used in huge tonnages today. Better investigate its economy and advantages for your production. Call in the Parker representative now!



Typical products formed from aluminum, Bonderized and painted in the strip.

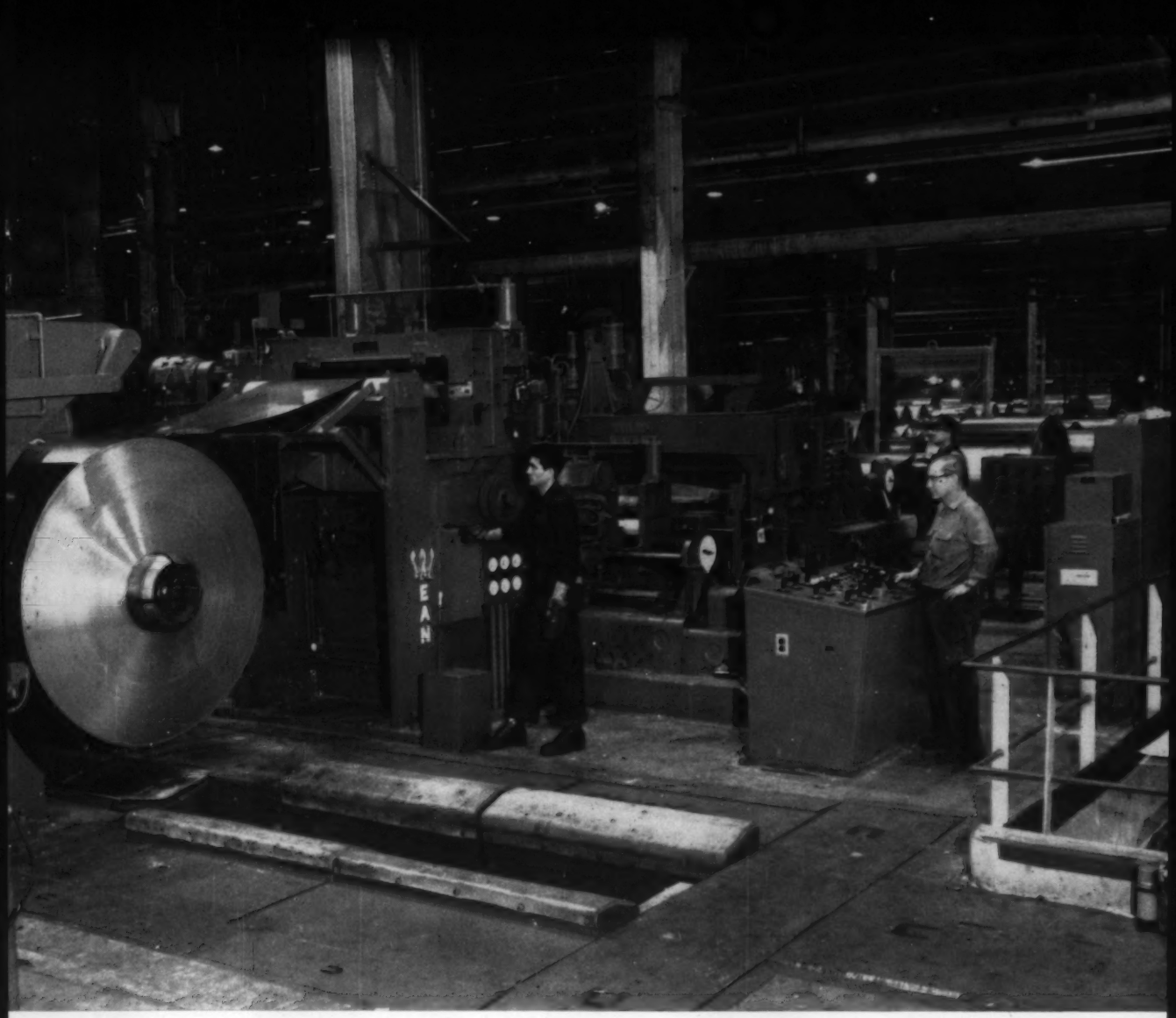
Parker Rust Proof Company
2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

Since 1914—Leader in the field

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT



Weirton Steel installs Wean Trimming Line for more efficient tinplate operation

Weirton Steel Company Division of National Steel Corporation recently installed this new Wean side trimming line to increase efficiency in its tinning operations. After the plate has been tempered to customer specifications, it is moved to the Wean tension-type line for final trimming. This advance preparation of coils provides larger, evenly wound coils for the electrolytic tinning line.

The Wean side trimming line has a maximum speed of 4,000 feet per minute and is able to handle 60,000 pound coils 18 to 45 inches wide. Inside diameter of the coils is 16½ inches; maximum outside diameter is 85 inches. Many new design features are incorporated to side-trim coil to accurate widths at high speed.

To improve the efficiency of your tinplate production, call upon a Wean representative to help you plan your requirements. Wean's "creative engineering" has played a vital role in the development of over 75% of the continuous tinplate processing lines in operation today.

WEAN

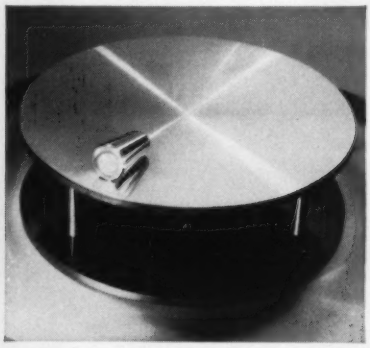
THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

HOW JOY KEEPS IDLERS BUSY LONGER UNDER DIRT, DUST

By switching to Timken® tapered roller bearings, Joy Manufacturing improved sealing for its Limberoller® two-bearing, single-unit Conveyor Idler . . . reduced bearing failures caused by dirt, dust, moisture. They also have continuous, smooth spillage-free and trouble-free operation. Timken bearings hold the idlers on center at all times, increase sealing efficiency, keep belt moving smoothly.

On your own bearing applications, you'll find that Timken bearings assure minimum maintenance, long bearing life because: 1) They hold shafts concentric with housings, making closures more effective in keeping lubricant *in*, dirt *out*. 2) The tapered construction of Timken bearings lets them take radial and thrust loads in any combination.

ENGINEERING SERVICE FOR THE ASKING. Let our Timken bearing salesmen—graduate engineers—tackle your bearing problems, solve them in a hurry. Save *you* time and money.



ROLLS FOREVER IN PERFECT CIRCLE on oscillating table, proving the accuracy of its taper. Another demonstration of Timken bearings' precision manufacture that assures trouble-free performance.

Industry rolls on

TIMKEN®

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO." *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ont.